United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Stokes Soil and Water Conservation District; and Stokes County Board of Commissioners

Soil Survey of Stokes County, North Carolina

How To Use This Soil Survey

General Soil Map

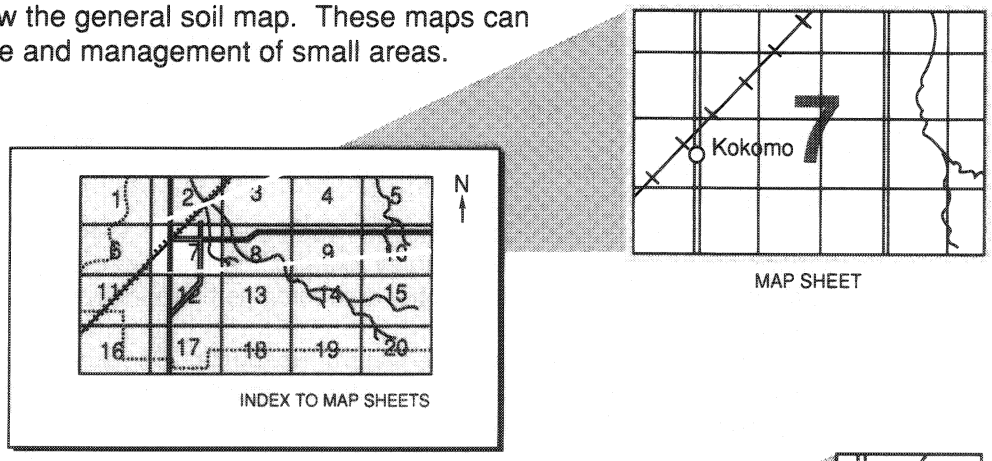
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

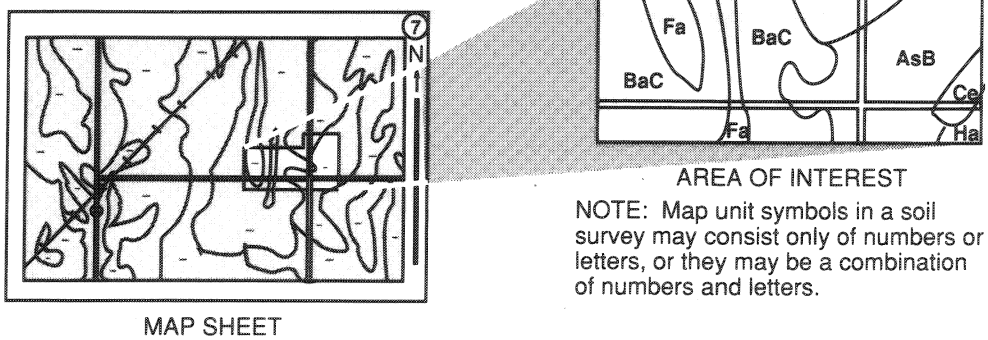
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the North Carolina Agricultural Research Service, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1990. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This soil survey was made cooperatively by the Natural Resources Conservation Service; the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Stokes Soil and Water Conservation District; and the Stokes County Board of Commissioners. It is part of the technical assistance furnished to the Stokes Soil and Water Conservation District. The Stokes County Board of Commissioners provided financial assistance for the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey of Stokes County was published in 1940 by the U.S. Department of Agriculture. This survey updates the first survey, provides more detailed maps on aerial photographs, and contains more interpretive information *(10)*.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A grassed waterway in an area of Sauratown channery fine sandy loam, 8 to 15 percent slopes. Moore's Knob is in the background.

Contents

Issued October 1995

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Stokes County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow over bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service.

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State Conservationist
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Soil Survey of Stokes County, North Carolina

By Roger J. Leab, Natural Resources Conservation Service

Soils surveyed by Roger J. Leab, David C. Clapp, and L. Darlene Monds, Natural Resources Conservation Service; and Michael D. Harman, Eric N. Thompson, and Kevin F. Bronson, North Carolina Department of Environment, Health, and Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Stokes Soil and Water Conservation District; and Stokes County Board of Commissioners

STOKES COUNTY is an agricultural county in northwestern North Carolina (fig. 1). It has a total of 291,795 acres, or 456 square miles. It is bounded on the north by Patrick and Henry Counties, Virginia, on the east by Rockingham County, on the south by Forsyth County, and on the west by Surry County.

In 1988, the population of Stokes County was about 36,500 *(16)*. The county seat is Danbury. It is near the center of the county, just north of the eastern end of the Sauratown Mountain Range along the Dan River. King, the largest and fastest growing town in the county, is along U.S. Highway 52 in the southwestern part of the county. Other towns in the county are Germanton and Walnut Cove in the southern part, Pinnacle in the western part, Francisco and Lawsonville in the northern part, and Sandy Ridge and Pine Hall in the eastern part.

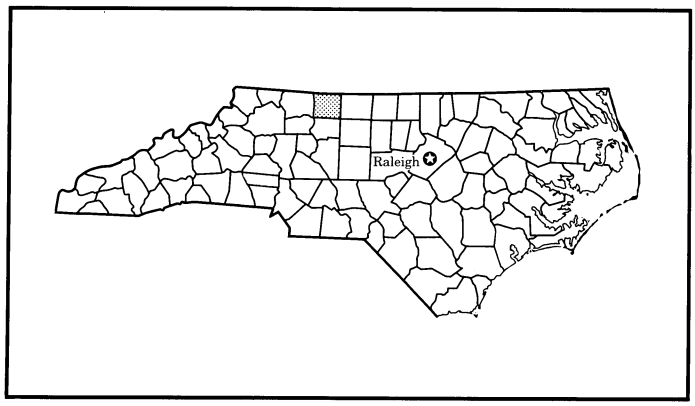

Figure 1.—Location of Stokes County in North Carolina.

General Nature of the County

This section gives general information about Stokes County. It describes history and settlement; physiography, relief, and drainage; water supply; and climate.

History and Settlement

In the early 1700's, English and Scotch-Irish settlers began to migrate from Virginia into the western Piedmont in North Carolina, including the area that became Stokes County in 1789. About 1753, German settlers also migrated into the area. The Scotch-Irish and German settlers both came for religious and political freedom *(18)*.

The earliest settlement was on the fertile farmland along the Dan River and Town Fork Creek but soon spread to other fertile areas throughout the county *(10, 18)*.

The early economy depended on natural resources, such as the soil and water. Farming was the main source of income. The early crops were corn, wheat,

tobacco, rye, apples, and vegetables. Today, tobacco is the main crop. In the late 1700's, forest products became important to the economy of the county. Because about 63 percent of the county is still used as woodland, timber production remains important *(12)*.

Physiography, Relief, and Drainage

Stokes County lies primarily in the Piedmont physiographic region. A small range of mountains, the Sauratown Mountain Range, is in the central part of the county. Two other small mountains, Brown Mountain and Archie's Knob, are in the northwestern part.

The base of the Sauratown Mountain Range has an average elevation of about 1,000 feet above sea level. In this range, Moore's Knob, at an elevation of 2,579 feet, is the highest point in the county. The lowest point, at about 590 feet, is along the eastern border where the Dan River leaves the county *(17)*.

The southwestern part of the county is drained by the Little Yadkin River. The river drains to the southwest. The northeastern part is drained by Crooked Creek and Buffalo Creek. They drain to the northeast. The Dan River flows diagonally across the county from northwest to southeast. The numerous creeks that flow into the Dan River include Elk Creek, Peters Creek, Big Creek, and Pinch Gut Branch in the northwestern part of the county; Double Creek, Seven Island Creek, Mill Creek, Flat Shoal Creek, and Snow Creek in the central part; and Town Fork Creek, Eurins Creek, and Belews Creek in the southeastern part.

Water Supply

Most areas of Stokes County have an adequate water supply. Generally, water is supplied by individual wells. The water supply for the city of King is pumped from the Yadkin River a few miles across the county line in Forsyth County. The municipal water supply for the other towns in the county is obtained from wells. Because of the barely adequate supply of water obtained from wells in some areas in the southeastern part of the county, a municipal reservoir is being considered.

Climate

Stokes County has long, hot summers because moist tropical air from the Gulf of Mexico persistently covers the area. Winters are cool and fairly short. Cold waves are rare and moderate in 1 or 2 days. Precipitation is fairly heavy throughout the year, and prolonged droughts are rare. Summer precipitation, mainly in the form of afternoon thunderstorms, is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Danbury, North Carolina, in the period 1951 to 1986. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 37 degrees F and the average daily minimum temperature is 25 degrees F. The lowest temperature on record, which occurred at Danbury on January 21, 1985, is -10 degrees F. In summer, the average temperature is 74 degrees F and the average daily maximum temperature is 85 degrees F. The highest recorded temperature, which occurred at Danbury on August 21, 1983, is 103 degrees F.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total average annual precipitation is about 45 inches. Of this, 23 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 6.99 inches at Danbury on June 21, 1972. Thunderstorms occur on about 46 days each year.

The average seasonal snowfall is 10 inches. The greatest snow depth at any one time during the period of record was 17 inches. On an average of 4 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9.0 miles per hour, in spring.

Severe local storms, including tornadoes, strike occasionally in or near the area. They are short in duration and cause variable and spotty damage. Every few years in summer or autumn, a tropical depression or remnant of a hurricane that has moved inland causes extremely heavy rains for 1 to 3 days.

How This Survey Was Made

This survey was made to provide information about the soils in Stokes County. The information includes a

description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They studied many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Soils occur in an orderly pattern that results from the combined influence over time of climate, parent material, relief, and plants and animals. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. This model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses. Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

Soil boundaries are drawn on aerial photographs and each delineation is identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or by an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and

management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Pacolet-Rion

Gently sloping to steep, well drained soils that have a loamy surface layer and a predominantly clayey or loamy subsoil; formed in material weathered from felsic metamorphic and igneous rock

These soils are on broad to narrow ridges and on side slopes throughout the county. This map unit makes up 54 percent of the county. It is about 70 percent Pacolet soils, 12 percent Rion soils, and 18 percent soils of minor extent (fig. 2).

The Pacolet soils have a surface layer of yellowish red sandy clay loam, brown fine sandy loam, or dark grayish brown gravelly fine sandy loam. The subsoil is predominantly red clay.

The Rion soils have a surface layer of yellowish brown or dark grayish brown fine sandy loam. The subsoil is predominantly strong brown sandy clay loam.

The soils of minor extent are Masada and Dogue soils on old stream terraces; Cecil, Wedowee, Wilkes, and Zion soils on ridges and the upper side slopes; Poindexter and Wateree soils on the lower side slopes; and Riverview, Toccoa, and Chewacla soils on flood plains.

Most areas of the major soils on the more gentle slopes are used as cropland or pasture. Most areas of the major soils on the steeper slopes are used as woodland. Some areas are used for urban development. The slope and the hazard of erosion are the main management concerns.

2. Pacolet-Cecil

Gently sloping to steep, well drained soils that have a loamy surface layer and a predominantly clayey subsoil; formed in material weathered from felsic metamorphic and igneous rock

These soils are mainly in the southwestern and northeastern parts of the county. This map unit makes up 14 percent of the county. It is about 52 percent Pacolet soils, 28 percent Cecil soils, and 20 percent soils of minor extent (fig. 3).

The Pacolet soils are on broad to narrow ridges and side slopes. They have a surface layer of yellowish red sandy clay loam, brown fine sandy loam, or dark grayish brown gravelly fine sandy loam. The subsoil is predominantly red clay.

The Cecil soils are on broad ridges and side slopes. They have a surface layer of yellowish red sandy clay loam or strong brown fine sandy loam. The subsoil is red clay.

The soils of minor extent are Rion, Wateree, Wilkes, and Zion soils on ridges and side slopes; Masada and Dogue soils on old stream terraces; and Riverview, Toccoa, and Chewacla soils on flood plains.

Most areas of the major soils are used as cropland or pasture. The rest are used as woodland or for urban development. The slope and the hazard of erosion are the main management concerns.

3. Rion-Pacolet-Wateree

Gently sloping to steep, well drained soils that have a loamy surface layer and a loamy or predominantly clayey subsoil; formed in material weathered primarily from felsic metamorphic and igneous rock

These soils are on narrow to very narrow ridges and side slopes, mainly in the north-central and southwestern parts of the county. This map unit makes

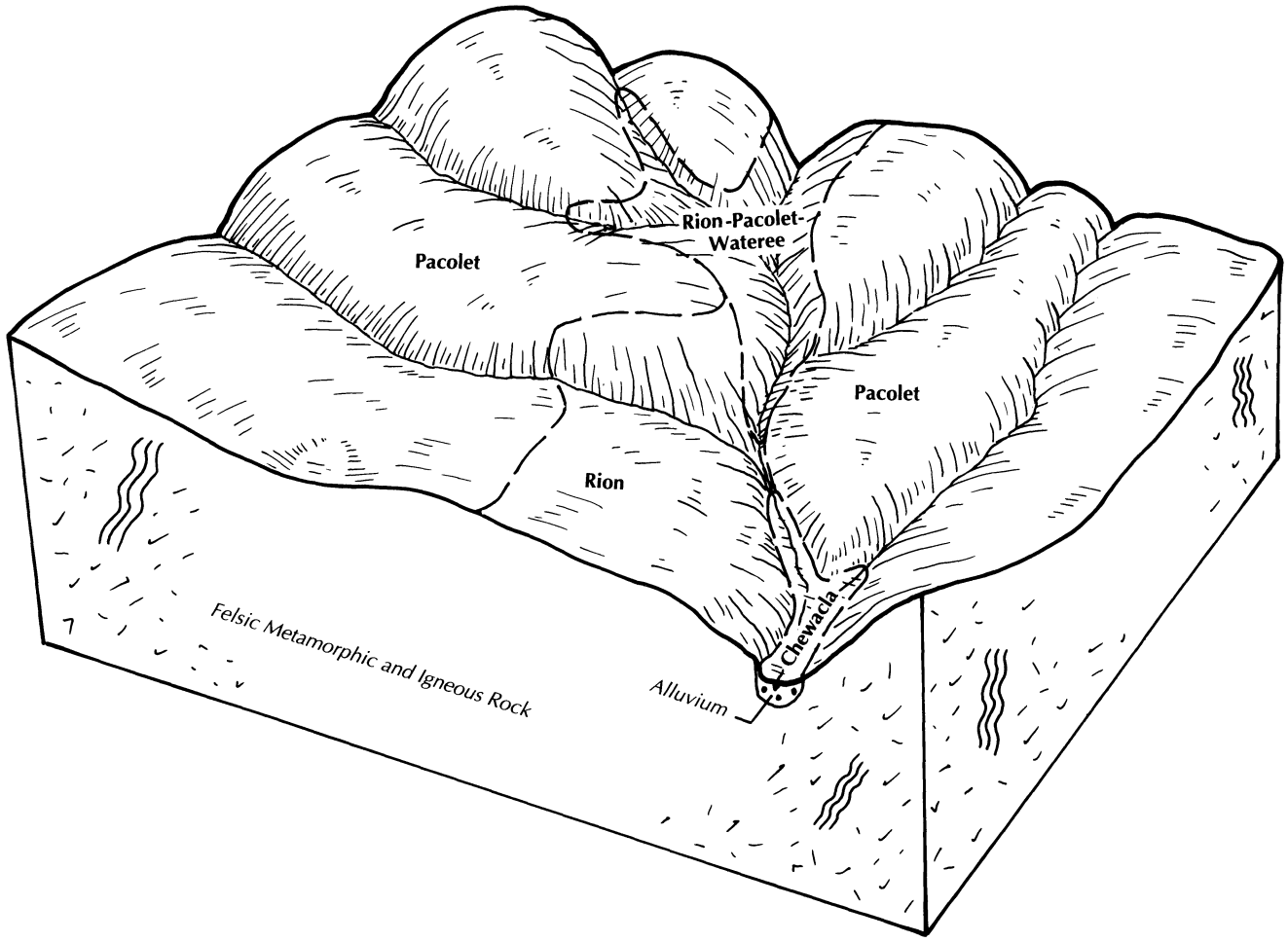

Figure 2.—Relationship of soils, landscape, and geology in the Pacolet-Rion general soil map unit.

up 10 percent of the county. It is about 30 percent Rion soils, 28 percent Pacolet soils, 13 percent Wateree soils, and 29 percent soils of minor extent (fig. 4).

The Rion soils have a surface layer of yellowish brown or dark grayish brown fine sandy loam. The subsoil is predominantly strong brown sandy clay loam.

The Pacolet soils have a surface layer of brown fine sandy loam, dark grayish brown gravelly fine sandy loam, or yellowish red sandy clay loam. The subsoil is predominantly red clay.

The Wateree soils have a surface layer of dark grayish brown fine sandy loam. The subsoil is brown fine sandy loam and strong brown channery fine sandy loam.

The soils of minor extent are Zion, Wedowee, and Wilkes soils on ridges and side slopes; Poindexter soils on side slopes; Masada and Dogue soils on old stream terraces; and Riverview, Toccoa, and Chewacla soils on flood plains.

Most areas of the major soils are used as woodland. Some of the gently sloping to moderately steep soils are used as cropland or pasture. The slope and the hazard of erosion are the main management concerns. The shallowness to bedrock is a limitation on the Wateree soils.

4. Mayodan

Gently sloping to steep, well drained soils that have a loamy surface layer and a predominantly clayey subsoil; formed in material weathered from sedimentary rock

These soils are on broad ridges and side slopes in the southeastern part of the county. This map unit makes up 9 percent of the county. It is about 78 percent

Mayodan soils and 22 percent soils of minor extent (fig. 5).

The Mayodan soils have a surface layer of dark brown fine sandy loam or brown sandy clay loam. The subsoil is predominantly yellowish red and reddish brown clay.

The soils of minor extent are Masada, Dogue, and Hornsboro soils on old stream terraces; Pacolet soils on ridges and side slopes; Pinkston soils on side slopes; and Riverview, Toccoa, and Chewacla soils on flood plains.

Most areas of the major soils are used as woodland. Some areas are used as cropland or for urban development. The slope, the hazard of erosion, and the moderate shrink-swell potential are the main management concerns.

5. Sauratown-Hayesville-Brevard

Gently sloping to steep, well drained soils that have a loamy surface layer and a loamy or clayey subsoil; formed in material weathered from felsic metamorphic rock or from colluvium

These soils are on narrow ridges and side slopes in the Sauratown Mountain Range and smaller mountains in the central and northwestern parts of the county. This map unit makes up 8 percent of the county. It is about 45 percent Sauratown soils, 22 percent Hayesville soils, 11 percent Brevard soils, and 22 percent soils of minor extent (fig. 6).

The Sauratown soils are on ridges and side slopes. They have a surface layer of dark brown channery fine sandy loam. The subsoil is predominantly yellowish

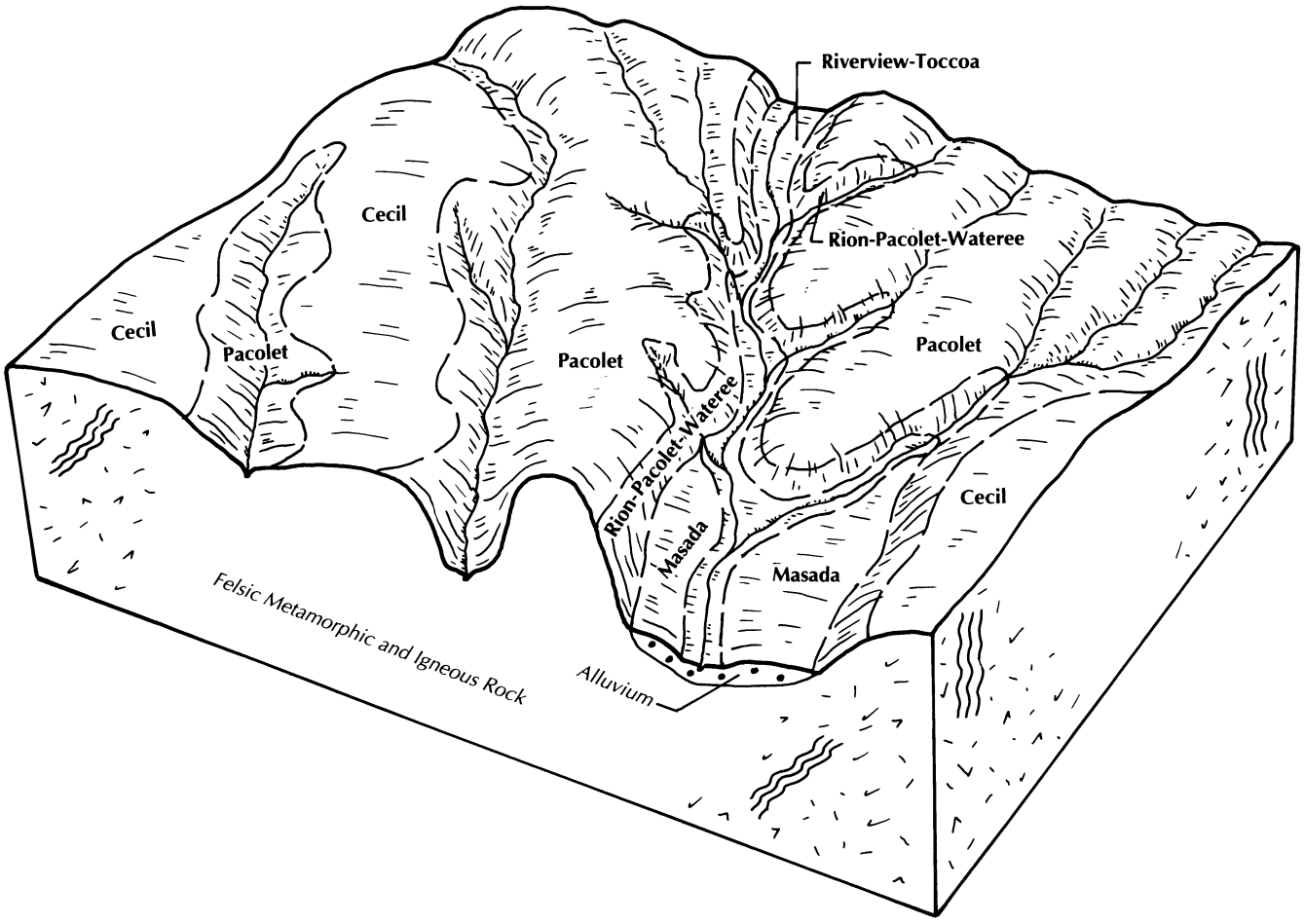

Figure 3.—Relationship of soils, landscape, and geology in the Pacolet-Cecil general soil map unit.

brown channery sandy clay loam. In some areas, these soils are very stony.

The Hayesville soils are on narrow ridges and side slopes. They have a surface layer of brown channery fine sandy loam or brown fine sandy loam. The subsoil is predominantly red clay. In some areas, these soils are very stony.

The Brevard soils are on strongly sloping to steep colluvial foot slopes, in coves, and on benches and fans. They have a surface layer of dark grayish brown very flaggy fine sandy loam. The subsoil is predominantly yellowish red and red flaggy sandy clay loam. These soils are extremely bouldery.

The soils of minor extent are Cowee and Ashe soils on ridges and side slopes and Greenlee soils on colluvial foot slopes and in coves. Also of minor extent are areas of Rock outcrop on ridges and side slopes.

Most areas of the major soils are used as woodland. Some of the more gently sloping areas are used as cropland or pasture. The slope, the hazard of erosion, and the large rock fragments on the surface of all of the major soils, and the shallowness to bedrock in the Sauratown soils are the main management concerns.

6. Riverview-Toccoa-Chewacla

Nearly level and gently sloping, well drained, moderately well drained, and somewhat poorly drained soils that have a loamy surface layer and a loamy subsoil or that have a loamy surface layer and loamy and sandy underlying material; formed in recent alluvium

These soils are along the Dan River and Town Fork Creek in the southeastern part of the county. This map unit makes up 2 percent of the county. It is about 40

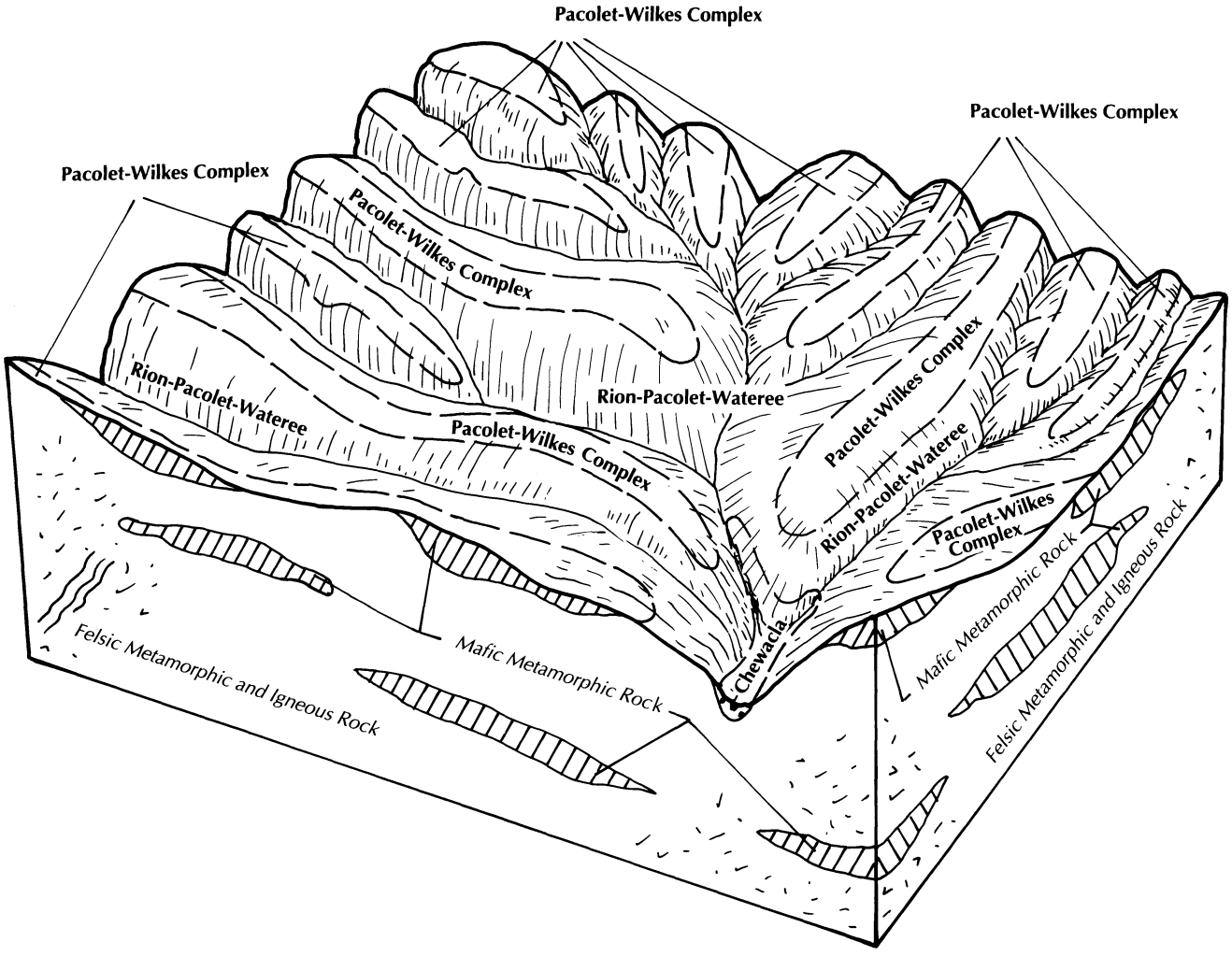

Figure 4.—Relationship of soils, landscape, and geology in the Rion-Pacolet-Wateree general soil map unit.

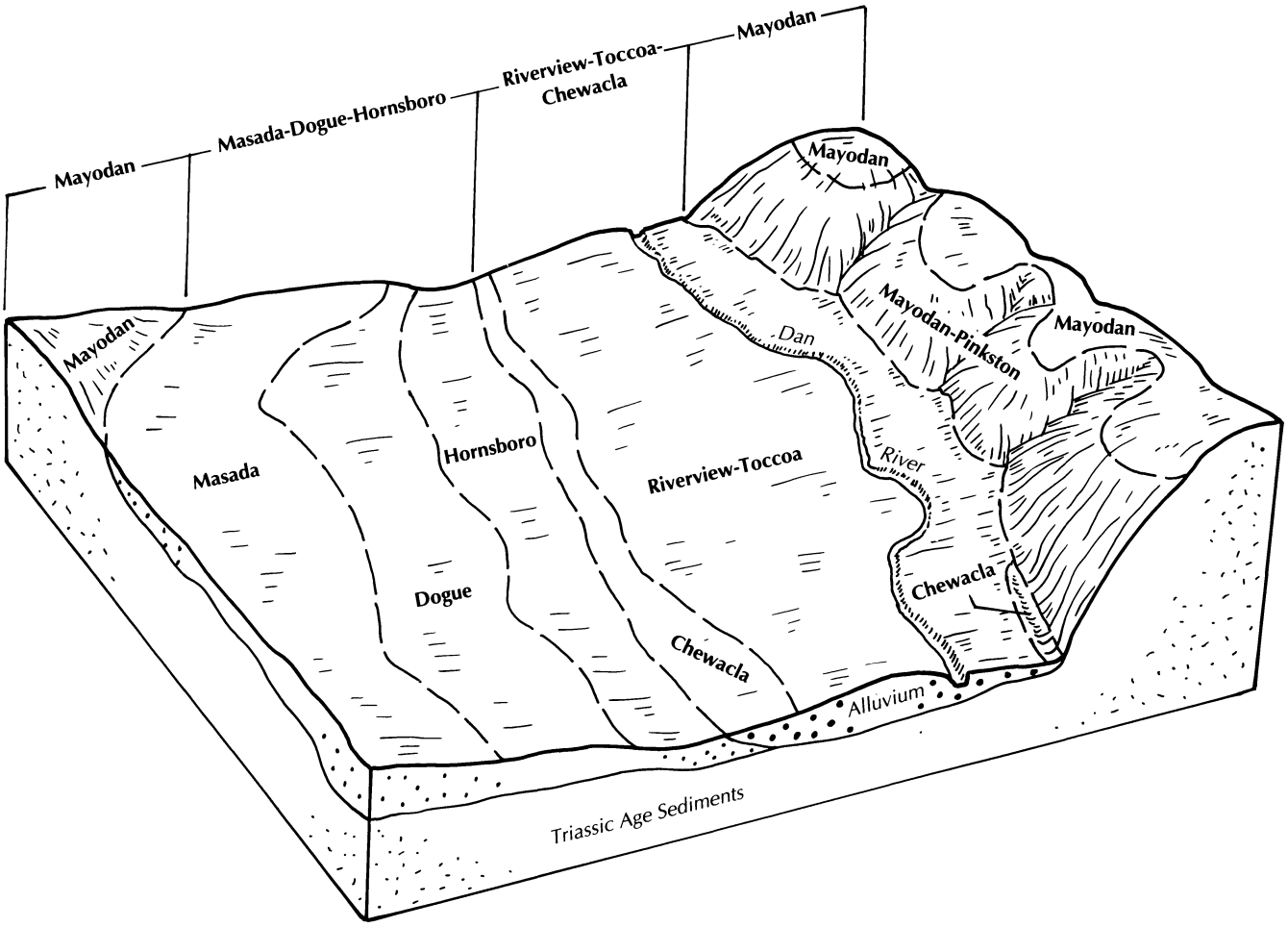

Figure 5.—Relationship of soils and parent material in the Mayodan, Masada-Dogue-Hornsboro, and Riverview-Toccoa-Chewacla general soil map units in the Triassic Basin along the Dan River.

percent Riverview soils, 32 percent Toccoa soils, 14 percent Chewacla soils, and 14 percent soils of minor extent (fig. 5).

The Riverview soils are well drained. In some areas they are adjacent to the streams, but they are generally separated from the streams by areas of the Toccoa soils. The Riverview soils have a surface layer of dark yellowish brown loam and a subsoil of brown and yellowish brown loam.

The Toccoa soils are well drained and moderately well drained. They are adjacent to the streams. They have a surface layer of dark brown fine sandy loam. The underlying material is brown fine sandy loam and strong brown sandy loam, fine sandy loam, and loamy fine sand.

The Chewacla soils are somewhat poorly drained. They are in the narrow troughs away from the larger streams. They have a surface layer of dark grayish brown and brown loam. The subsoil is brown, light yellowish brown, and gray sandy clay loam.

The soils of minor extent are Masada, Dogue, and Hornsboro soils. These soils are on the older stream terraces, generally in the area of the map unit that is farthest away from the larger streams.

The Riverview and Toccoa soils are used mainly as cropland. Some areas of these soils are used as pasture. The Chewacla soils are used mainly as cropland, pasture, or woodland. The main management concerns are flooding on all of the major soils and wetness in the Chewacla soils.

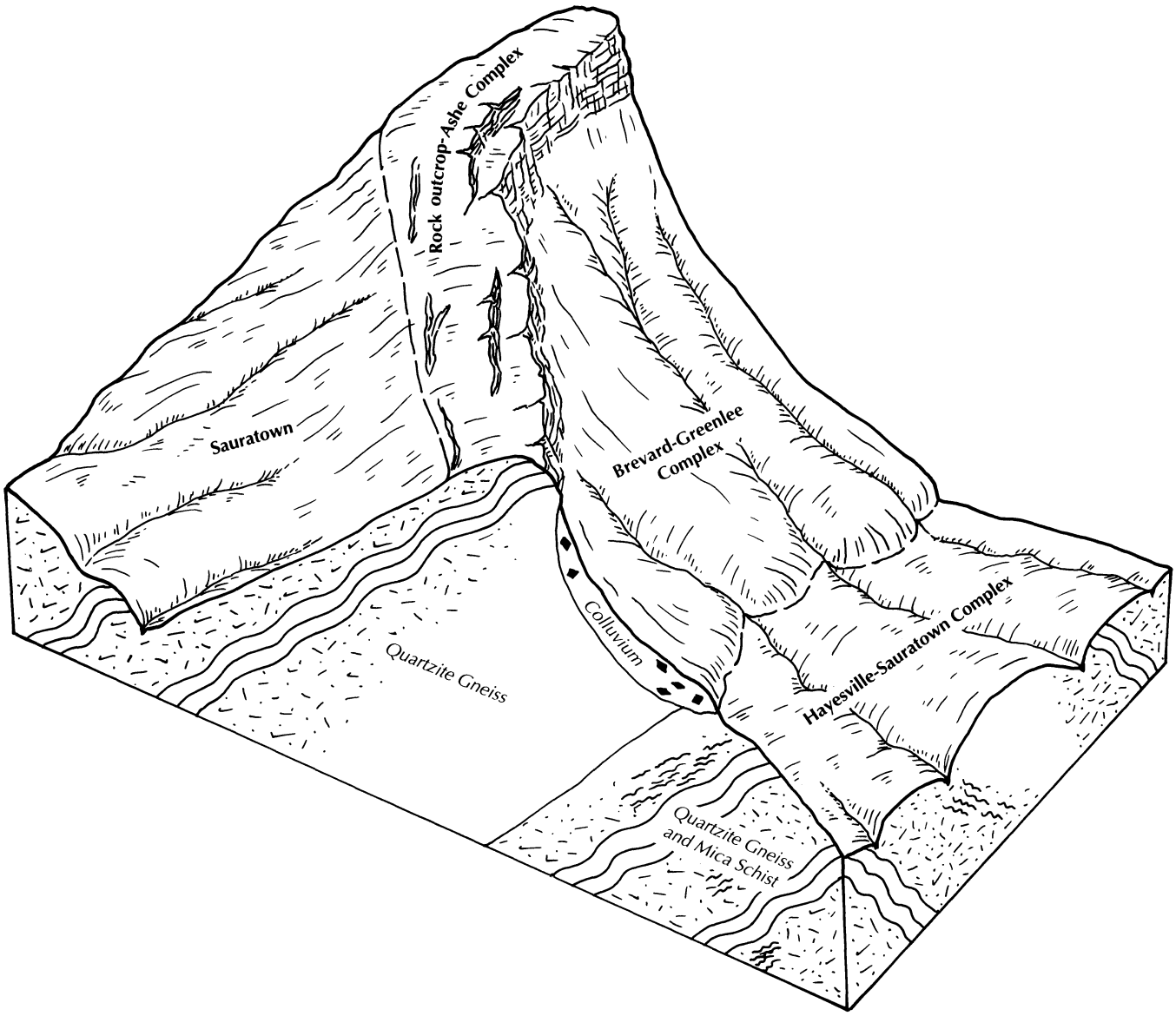

Figure 6.—Relationship of soils, landscape, and geology in the Sauratown-Hayesville-Brevard general soil map unit.

7. Poindexter-Wilkes

Strongly sloping to steep, well drained soils that have a loamy surface layer and a loamy subsoil; formed in material weathered from mafic and intermediate metamorphic and igneous rock

These soils are on narrow ridges and side slopes scattered throughout the county. This map unit makes up 2 percent of the county. It is about 40 percent Poindexter soils, 25 percent Wilkes soils, and 35 percent soils of minor extent.

The Poindexter soils are on side slopes. They have a surface layer of dark brown fine sandy loam and a subsoil of dark yellowish brown clay loam.

The Wilkes soils are on narrow ridges and side slopes. They have a surface layer of yellowish brown fine sandy loam. The subsoil is yellowish brown sandy clay loam and clay loam.

The soils of minor extent are Pacolet, Rion, and Zion soils on ridges and side slopes; Masada and Dogue soils on old stream terraces; and Riverview, Toccoa, and Chewacla soils on flood plains.

Most areas of the major soils are used as woodland. A few of the more gently sloping areas are used as

cropland or pasture. The main management concerns are the slope, the hazard of erosion, and the shallowness to bedrock on all of the major soils and the moderately slow permeability and the moderate shrink-swell potential in the Wilkes soils.

8. Masada-Dogue-Hornsboro

Nearly level to strongly sloping, well drained, moderately well drained, and somewhat poorly drained soils that have a loamy surface layer and a predominantly clayey subsoil; formed in old alluvium

These soils are on high stream terraces near the Dan River, Town Fork Creek, and other major streams in the southeastern part of the county. This map unit makes up 1 percent of the county. It is about 37 percent Masada soils, 32 percent Dogue soils, 10 percent Hornsboro soils, and 21 percent soils of minor extent (fig. 5).

The Masada soils are well drained and are on the higher parts of the landscape. They have a surface layer of yellowish brown sandy clay loam and a subsoil of strong brown, yellowish red, and red clay.

The Dogue soils are moderately well drained and generally are below the Masada soils and above the Hornsboro soils on the landscape. They have a surface layer of dark brown fine sandy loam. The subsoil is brownish yellow clay loam, light yellowish brown clay, and light gray sandy clay loam.

The Hornsboro soils are somewhat poorly drained and are on the lower parts of the landscape. They have a surface layer of dark grayish brown loam. The subsoil is pale brown loam, light brownish gray and gray clay, and brownish yellow and light yellowish brown clay loam.

The soils of minor extent are Chewacla, Riverview, and Toccoa soils on flood plains and Mayodan and Pacolet soils on ridges and side slopes.

Most areas of the major soils are used as cropland or pasture. The rest are used as woodland. Wetness, the hazard of flooding, the moderate shrink-swell potential, and the moderately slow or slow permeability are the main management concerns. Erosion is a hazard in the more sloping areas.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of the dominant soils within the map unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under the heading "Use and Management of the Soils."

The map units on the detailed soil maps represent areas on the landscape and consist mainly of the dominant soils for which the units are named.

Symbols identifying the soils precede the map unit names in the map unit descriptions. The descriptions include general facts about the soils and give the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are named as phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Pacolet sandy clay loam, 2 to 8 percent slopes, eroded, is a phase of the Pacolet series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more contrasting soils, or miscellaneous land areas, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Mayodan-Pinkston complex, 25 to 45 percent slopes, is an example.

An *undifferentiated group* is made up of two or more dominant soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

This survey includes *miscellaneous areas*. Some miscellaneous areas have little or no soil material and support little or no vegetation. Rock outcrop is an example. Miscellaneous areas are shown on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

BrD—Brevard-Greenlee complex, 8 to 25 percent slopes, extremely bouldery. This map unit consists mainly of very deep, well drained Brevard and Greenlee soils on foot slopes, in coves, and on benches and fans in the Sauratown Mountain Range. Most areas are elongated and irregular in width or are fan shaped. They range from 5 to 50 acres in size. Rock fragments on the surface of the two soils range in size from channers to boulders. The larger rock fragments on the Brevard soil average about 40 inches in diameter and are 10 to 120 feet apart. The larger rock fragments on the Greenlee soil average about 48 inches in diameter and are 3 to 60 feet apart.

The Brevard soil makes up about 50 percent of the

map unit, and the Greenlee soil makes up 20 percent. The two soils occur as areas so intricately mixed that mapping them separately is not practical at the scale of mapping. The Brevard soil is on the less bouldery parts of the map unit in the more stable areas between drainageways. The Greenlee soil is on the more bouldery parts of the map unit along intermittent drainageways and directly below areas of rock outcrop.

Typically, the surface layer of the Brevard soil is dark grayish brown very flaggy fine sandy loam 3 inches thick. The subsurface layer is light yellowish brown very flaggy fine sandy loam 10 inches thick. The subsoil extends to a depth of more than 65 inches. It is reddish yellow flaggy fine sandy loam in the upper part, yellowish red and red flaggy sandy clay loam in the next part, and light red flaggy fine sandy loam in the lower part.

Permeability is moderate in the Brevard soil. Available water capacity also is moderate. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Greenlee soil is very dark grayish brown very flaggy loam 2 inches thick. The subsurface layer is yellowish brown very flaggy loam 6 inches thick. The subsoil to a depth of 62 inches is very flaggy loam. It is brownish yellow in the upper part and light yellowish brown in the lower part.

Permeability is moderately rapid in the Greenlee soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, Hayesville, and Sauratown soils. These soils formed in residuum and are on the narrow remnants of ridges. Ashe and Sauratown soils have hard bedrock at a depth of 20 to 40 inches. Cowee soils have partly weathered bedrock at a depth of 20 to 40 inches. Hayesville soils have a clayey subsoil. Also included are some scattered small areas of colluvial soils that have a clayey subsoil, colluvial soils that have bedrock within a depth of 60 inches, rock outcrop, and rubble land. The rubble land is along small intermittent drainageways and at the base of rock outcrop. Included areas make up about 30 percent of the map unit.

Most of the acreage in this map unit is used as woodland. A small acreage is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by chestnut oak, white oak, northern red oak, scarlet oak, Virginia pine, eastern white pine, and yellow-poplar. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. The main management concerns are the large rocks on the surface, the slope, the hazard of erosion, and the seedling mortality rate.

The rock fragments on the surface of these soils limit operation of the equipment used in harvesting and replanting trees (fig. 7). Wheeled tractors and vehicles that have high ground clearance can be operated only over carefully chosen routes between the boulders. The content of rock fragments in the soils reduces the amount of moisture available to plants and increases the seedling mortality rate. Because of the size and abundance of the rock fragments, seedlings should be planted by hand on carefully selected sites. Loblolly pine and eastern white pine generally are recommended for planting.

This map unit is seldom used for field crops. The slope and the large rock fragments on the surface are the main limitations. The slope results in a hazard of erosion, and the rock fragments make conventional tillage impractical. Where the rock fragments are removed from the surface, the Brevard soil is occasionally used as cropland. In the areas used as cropland, conservation measures are needed to control erosion. The Greenlee soil has so many rock fragments that removing them from the surface would not eliminate cultivation problems.

Mainly because of the large rock fragments on the surface, establishing or maintaining pasture and hay commonly is impractical. Where the rocks have been removed from the surface, the Brevard soil is occasionally used as pasture.

The slope and the large rock fragments on the surface are the main limitations affecting urban uses. They are severe limitations affecting building site development, recreational development, and sanitary facilities. Measures that control erosion and sedimentation are needed on construction sites where the plant cover has been removed. These measures help to prevent the offsite damage caused by sedimentation.

The Brevard soil is in capability subclass VIs. Based on eastern white pine as the indicator species, the woodland ordination symbol in areas of this soil is 11R. The Greenlee soil is in capability subclass VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol in areas of this soil is 8X.

BrE—Brevard-Greenlee complex, 25 to 60 percent slopes, extremely bouldery. This map unit consists mainly of very deep, well drained Brevard and Greenlee soils on foot slopes, in coves, and on benches and fans in the Sauratown Mountain Range. Most areas are elongated and irregular in width or are fan shaped.

Figure 7.—Stones and boulders on the surface in a wooded area of Brevard-Greenlee complex, 8 to 25 percent slopes, extremely bouldery.

They range from 5 to 300 acres in size. Rock fragments on the surface of the two soils range in size from channers to boulders. The larger rock fragments on the Brevard soil average about 40 inches in diameter and are 10 to 120 feet apart. The larger rock fragments on the Greenlee soil average about 48 inches in diameter and are 3 to 60 feet apart.

The Brevard soil makes up about 45 percent of the map unit, and the Greenlee soil makes up 25 percent. The two soils occur as areas so intricately mixed that mapping them separately is not practical at the scale of mapping. The Brevard soil is on the less bouldery parts of the map unit in the more stable areas between drainageways. The Greenlee soil is on the more bouldery parts of the map unit along intermittent drainageways and directly below areas of rock outcrop.

Typically, the surface layer of the Brevard soil is dark grayish brown very flaggy fine sandy loam 3 inches thick. The subsurface layer is light yellowish brown very flaggy fine sandy loam 10 inches thick. The subsoil extends to a depth of more than 65 inches. It is reddish yellow flaggy fine sandy loam in the upper part, yellowish red and red flaggy sandy clay loam in the next part, and light red flaggy fine sandy loam in the lower part.

Permeability is moderate in the Brevard soil.

Available water capacity also is moderate. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Greenlee soil is very dark grayish brown very flaggy loam 2 inches thick. The subsurface layer is yellowish brown very flaggy loam 6 inches thick. The subsoil to a depth of 62 inches is very flaggy loam. It is brownish yellow in the upper part and light yellowish brown in the lower part.

Permeability is moderately rapid in the Greenlee soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, Hayesville, and Sauratown soils. These soils formed in residuum and are on the narrow remnants of ridges. Ashe and Sauratown soils have hard bedrock at a depth of 20 to 40 inches. Cowee soils have partly weathered bedrock at a depth of 20 to 40 inches. Hayesville soils have a clayey subsoil. Also included are scattered small areas of colluvial soils that have a clayey subsoil, colluvial soils that have bedrock within a depth of 60 inches, rock outcrop, and rubble land. The rubble land is along small intermittent drainageways and at the base of rock outcrop. Included areas make up about 30 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. Forested areas are commonly dominated by chestnut oak, white oak, northern red oak, scarlet oak, Virginia pine, eastern white pine, and yellow-poplar. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. The main management concerns are the large rocks on the surface, the slope, the hazard of erosion, and the seedling mortality rate.

The rock fragments on the surface of these soils limit operation of the equipment used in harvesting and planting trees. Wheeled tractors and vehicles that have high ground clearance can be operated only over carefully chosen routes between the boulders in the less sloping parts of the map unit. The content of rock fragments in the soils reduces the amount of moisture available to plants and increases the seedling mortality rate. Because of the slope and the size and abundance of the rock fragments, seedlings should be planted by hand on carefully selected sites. Loblolly pine and eastern white pine generally are recommended for planting.

This map unit is not used as cropland or pasture. Because of the slope and the large rock fragments on the surface, conventional tillage methods and pasture maintenance are impractical.

The slope and the large rock fragments on the surface are the main limitations affecting urban uses. They are severe limitations affecting building site development, recreational development, and sanitary facilities. Measures that control erosion and sedimentation are needed at construction sites where the plant cover has been removed. These measures help to prevent the offsite damage caused by sedimentation.

The capability subclass is VIIs. Based on eastern white pine as the indicator species, the woodland ordination symbol in areas of the Brevard soil is 11R. Based on yellow-poplar as the indicator species, the woodland ordination symbol in areas of the Greenlee soil is 8R.

CcB—Cecil fine sandy loam, 2 to 8 percent slopes. This map unit consists mainly of very deep, well drained Cecil and similar soils. It is on broad ridges in the southwestern and northeastern parts of the county. Most areas are elongated and irregular in width and range from 10 to 150 acres in size.

Typically, the surface layer is strong brown fine sandy loam 3 inches thick. The subsurface layer is brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 55 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 60 inches is red saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are a few small areas of Masada and Pacolet soils. Masada soils have a subsoil that is more plastic than that of the Cecil soil. They are in flat to slightly concave areas that are protected from erosion. Pacolet soils have a subsoil that is thinner than that of the Cecil soil. They are in scattered areas throughout the map unit. Also included are a few small areas of Cecil soils where many pebbles and cobbles are in the surface layer. Included soils make up about 5 percent of the map unit.

Most of the acreage in this map unit supports hardwood forest. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by white oak, northern red oak, scarlet oak, yellow-poplar, and Virginia pine. Loblolly pine is common in areas where trees are planted. It generally

is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland use and management.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. The hazard of erosion is the main management concern.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. No major limitations affect this use.

This map unit has few limitations affecting building site development and recreational development. The moderate permeability is a limitation on sites for septic tank absorption fields. It generally can be overcome by increasing the size of the absorption area. A high content of clay in the subsoil is a moderate limitation on sites for sanitary landfills. Low strength is a moderate limitation on sites for local roads and streets. The hazard of erosion is moderate on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

CeB2—Cecil sandy clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of very deep, well drained Cecil and similar soils. It is on broad ridges, mainly in the northeastern and southwestern parts of the county. Some of the larger areas are in and around the town of King. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width and range from 10 to 250 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 55 inches. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 60 inches is red saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Masada, Pacolet, and Zion soils. Masada soils have a subsoil that is more plastic than that of the Cecil soil. They are in flat to slightly concave areas that are protected from erosion. Pacolet soils have a subsoil that is thinner than that of the Cecil soil. Zion soils have a yellow subsoil that is thinner and more plastic than that of the Cecil soil and have bedrock within a depth of 40 inches. Pacolet and Zion soils are in scattered areas throughout the map unit. Also included are scattered small areas where many pebbles or cobbles are in the surface layer and small areas of rock outcrop. Included areas make up about 10 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

The main crops are tobacco, soybeans, corn, and small grain. Surface runoff, the hazard of erosion, and the effects of past erosion are the main management concerns. Maintaining tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, and northern red oak. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The hazard of erosion is the main management concern.

This map unit has few limitations affecting building site development and recreational development. The moderate permeability is a limitation on sites for septic tank absorption fields. It generally can be overcome by increasing the size of the absorption area. A high content of clay in the subsoil is a moderate limitation on sites for sanitary landfills. Low strength is a moderate limitation on sites for local roads and streets. The hazard of erosion is moderate on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7C.

CeC2—Cecil sandy clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of very deep, well drained Cecil and similar soils. It is on side slopes, mainly in the northeastern and southwestern parts of the county. Some of the larger areas are in and around the town of King. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas

are elongated and irregular in width and range from 10 to 250 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 55 inches. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 60 inches is red saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are a few small areas of Masada, Pacolet, and Wilkes soils. Masada soils have a subsoil that is more plastic than that of the Cecil soil. They generally are on nose slopes, foot slopes, and the lower part of side slopes of remnant high stream terraces. Pacolet soils have a subsoil that is thinner than that of the Cecil soil. Wilkes soils are yellower than the Cecil soil and have weathered bedrock within a depth of 20 inches. Pacolet and Wilkes soils are in scattered areas throughout the map unit. Also included are a few small areas of rock outcrop and a few areas where many pebbles or cobbles are in the surface layer. Included areas make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

The main crops are tobacco, soybeans, corn, and small grain. Surface runoff, the hazard of erosion, and the effects of past erosion are the main management concerns. Maintaining tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, and northern red oak. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The hazard of erosion is the main management concern.

The slope is the main limitation affecting building site development and recreational development. The slope and the moderate permeability are moderate limitations on sites for septic tank absorption fields. Increasing the size of the absorption area generally helps to overcome the restricted permeability. Low strength is a moderate limitation on sites for local roads and streets. The hazard of erosion is severe on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7C.

ChA—Chewacla loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of very deep, somewhat poorly drained Chewacla and similar soils. It is on narrow flood plains and in narrow troughs on broad flood plains throughout the county. Most areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is loam 9 inches thick. It is dark grayish brown in the upper part and brown in the lower part. The subsoil extends to a depth of 40 inches. It is sandy clay loam. It is brown in the upper part, light yellowish brown in the next part, and gray in the lower part. The underlying material extends to a depth of 60 inches. It is gray sandy loam in the upper part and gray gravelly coarse sand in the lower part.

Permeability and available water capacity are moderate. Surface runoff is slow. The hazard of erosion is slight. The shrink-swell potential is low in the subsoil. The depth to a seasonal high water table is 0.5 foot to 1.5 feet. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are a few small areas of Riverview, Toccoa, and Hornsboro soils. Also included are small areas of a soil that is sandier than the Chewacla soil, a wetter soil, a wetter soil that has a clayey subsoil, and a soil that has a layer of gravel within a depth of 40 inches. Riverview and Toccoa soils are well drained or moderately well drained and are on the higher part of the landscape. Hornsboro soils have a clayey subsoil. Hornsboro soils, the sandier soil, and the soil that has a layer of gravel are in scattered areas throughout the map unit. The wetter soils are on the lower part of the landscape. Included soils make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

The main crops are corn, soybeans, and small grain. The occasional flooding and the wetness are the main management concerns. Crop production can be increased by controlling flooding and by installing a drainage system. Maintaining crop residue on or near

the surface minimizes surface crusting, improves tilth, and increases the rate of water infiltration and the content of organic matter.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The flooding and the wetness are the main management concerns.

Forested areas of this map unit are commonly dominated by willow oak, green ash, American sycamore, yellow-poplar, and red maple. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are black willow, river birch, and greenbrier. The flooding and the wetness are the main management concerns. They limit the use of equipment.

This map unit is severely limited as a site for all urban uses because of the wetness and the flooding. Overcoming these limitations is expensive, and local zoning ordinances generally prevent urban development in areas of this unit.

The capability subclass is IIIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 10W.

CwD—Cowee gravelly loam, 8 to 25 percent slopes, stony. This map unit consists mainly of moderately deep, well drained Cowee and similar soils. It is on ridges and side slopes, mainly on Archie's Knob, which is in the northwestern part of the county. Stones on the surface average about 10 inches in diameter and are 25 to 75 feet apart. Most areas are elongated and irregular in width and range from 20 to 150 acres in size.

Typically, the surface layer is dark grayish brown gravelly loam 2 inches thick. The subsurface layer is yellowish brown gravelly loam 5 inches thick. The subsoil extends to a depth of 31 inches. It is brown gravelly loam in the upper part and strong brown and yellowish red gravelly clay loam in the lower part. Partly weathered, multicolored bedrock extends to a depth of more than 60 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is medium or rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to soft bedrock is 20 to 40 inches.

Included in this unit in mapping are a few small areas of Hayesville and Sauratown soils; a deep soil that has a brown, loamy subsoil; a deep soil that has a red, loamy subsoil; and a moderately deep soil that has a red, clayey subsoil. Also included are a few small areas of rock outcrop. Hayesville soils have a clayey subsoil and are more than 60 inches deep over bedrock. Sauratown soils have a brown subsoil and have hard bedrock at a depth of 20 to 40 inches. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by chestnut oak, scarlet oak, northern red oak, eastern white pine, and Virginia pine. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. The hazard of erosion is moderate. The slope is a moderate limitation affecting the use of equipment. It can result in overturning of the equipment. The depth to bedrock results in a moderate windthrow hazard. Loblolly pine and eastern white pine generally are recommended for planting.

Where this map unit is cultivated, tobacco, soybeans, corn, and small grain are the main crops. The main management concerns are the slope, the severe hazard of erosion, and the large stones in the surface layer. Conservation practices that help to control erosion and increase the content of organic matter are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The number of large stones on the surface is the main limitation. The stones generally can be removed or avoided. Care is needed to prevent the overturning of equipment.

This map unit is moderately or severely limited as a site for buildings and recreational development because of the slope, the depth to bedrock, and the large stones on the surface. Limitations are severe on sites for septic tank absorption fields. The hazard of erosion is severe on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is VIs. Based on chestnut oak as the indicator species, the woodland ordination symbol is 3R.

CwE—Cowee gravelly loam, 25 to 60 percent slopes, stony. This map unit consists mainly of moderately deep, well drained Cowee and similar soils. It is on side slopes, mainly on Archie's Knob, which is in the northwestern part of the county. Stones on the surface average about 10 inches in diameter and are 25 to 75 feet apart. Most areas are elongated and irregular in width and range from 5 to 60 acres in size.

Typically, the surface layer is dark grayish brown gravelly loam 2 inches thick. The subsurface layer is yellowish brown gravelly loam 5 inches thick. The subsoil extends to a depth of 31 inches. It is brown gravelly loam in the upper part and strong brown and yellowish red gravelly clay loam in the lower part. Partly

weathered, multicolored bedrock extends to a depth of more than 60 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid or very rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to soft bedrock is 20 to 40 inches.

Included in this unit in mapping are a few small areas of Hayesville and Sauratown soils; a deep soil that has a brown, loamy subsoil; a deep soil that has a red, loamy subsoil; and a moderately deep soil that has a red, clayey subsoil. Also included are a few small areas of rock outcrop. Hayesville soils have a clayey subsoil and are more than 60 inches deep over bedrock. Sauratown soils have a brown subsoil and have hard bedrock at a depth of 20 to 40 inches. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. A small acreage is used as pasture.

Forested areas of this map unit are commonly dominated by chestnut oak, scarlet oak, northern red oak, eastern white pine, and Virginia pine. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. The slope is a severe limitation affecting woodland management. It can result in the overturning of equipment. The hazard of erosion is severe. The depth to bedrock results in a moderate windthrow hazard. Loblolly pine and eastern white pine generally are recommended for planting.

This map unit generally is not used as cropland or pasture. Because of the slope and the very severe hazard of erosion, cultivation is impractical. A few small areas are used as wooded pasture.

This map unit is severely limited as a site for all urban uses because of the slope. The hazard of erosion is very severe where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is VIIs. Based on chestnut oak as the indicator species, the woodland ordination symbol is 3R.

DgB—Dogue fine sandy loam, 2 to 8 percent slopes, rarely flooded. This map unit consists mainly of very deep, moderately well drained Dogue and similar soils. It is on stream terraces throughout the county. It is most extensive in the southern part of the county, along the Dan River and Town Fork Creek. Most areas are long and narrow and range from 5 to 80 acres in size.

Typically, the surface layer is dark brown fine sandy loam 3 inches thick. The subsurface layer is light yellowish brown loam 6 inches thick. The subsoil extends to a depth of more than 60 inches. It is brownish yellow clay loam in the upper part, light yellowish brown clay in the next part, and light gray sandy clay loam in the lower part.

Permeability is moderately slow. Available water capacity is moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential of the subsoil is moderate. The depth to a seasonal high water table is 1.5 to 3.0 feet. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Masada, Hornsboro, Chewacla, Toccoa, and Riverview soils. Masada soils are well drained and are on the higher part of the landscape. Hornsboro soils are somewhat poorly drained and are on the lower part of the landscape. Chewacla, Toccoa, and Riverview soils are less clayey than the Dogue soil and are in the areas nearest to the stream. Chewacla soils are somewhat poorly drained. Also included are some small areas of Dogue soils where many pebbles and cobbles are in the surface layer. Included soils make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, yellow-poplar, southern red oak, American beech, and red maple. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, and American holly. The wetness is a moderate limitation affecting the use of equipment. Timber harvesting should be limited to dry periods.

Corn, soybeans, and small grain are the main crops. Tobacco is occasionally grown. A drainage system is needed for optimum yields of tobacco and other crops that need good drainage. Erosion is a moderate hazard when the soil is cultivated. Conservation practices that help to control erosion are needed. The soil has brief periods of rare flooding.

Where this map unit is used for pasture and hay, it is commonly planted to tall fescue and ladino clover. No major limitations affect management.

The flooding is a severe hazard on sites for buildings. This map unit is severely limited as a site for septic tank absorption fields because of the wetness and the moderately slow permeability. The wetness, the flooding, and a high content of clay are severe limitations on sites for sanitary facilities. Low strength is a severe limitation on sites for local roads and streets. The flooding, the wetness, and the moderately slow permeability are moderate or severe limitations affecting recreational development.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

DgC—Dogue fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of very deep, moderately well drained Dogue and similar soils. It is on stream terraces throughout the county. It is most extensive in the southern part of the county, along the Dan River and Town Fork Creek. Most areas are long and narrow and range from 5 to 20 acres in size.

Typically, the surface layer is dark brown fine sandy loam 3 inches thick. The subsurface layer is light yellowish brown loam 6 inches thick. The subsoil extends to a depth of more than 60 inches. It is brownish yellow clay loam in the upper part, light yellowish brown clay in the next part, and light gray sandy clay loam in the lower part.

Permeability is moderately slow. Available water capacity is moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to a seasonal high water table is 1.5 to 3.0 feet. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Masada and Hornsboro soils and small areas of a soil that has a loamy subsoil. Masada soils are well drained and are on the higher part of the landscape. Hornsboro soils are wetter than the Dogue soil and are on the lower part of the landscape. The soil that has a loamy subsoil is in scattered areas throughout the map unit. Also included are some small areas of Dogue soils where many pebbles or cobbles are in the surface layer. Included soils make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, yellow-poplar, southern red oak, American beech, and red maple. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, and American holly. The wetness is a moderate limitation affecting the use of equipment. Timber harvesting should be limited to dry periods.

Corn, soybeans, and small grain are the main crops. Tobacco is occasionally grown. A drainage system is needed for optimum yields of tobacco and other crops that need good drainage. The hazard of erosion is severe when the soil is cultivated. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer are needed.

Where this map unit is used for pasture and hay, it is commonly planted to tall fescue and ladino clover. No major limitations affect management.

The wetness and the moderate shrink-swell potential are the main limitations affecting building site development. The wetness and the moderately slow permeability are severe limitations on sites for septic tank absorption fields. The wetness and a high content of clay are severe limitations on sites for sanitary facilities. Low strength is a severe limitation on sites for local roads and streets. The wetness, the slope, and the moderately slow permeability are the main limitations affecting recreational development.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

HaC—Hayesville channery fine sandy loam, 8 to 15 percent slopes, very stony. This map unit consists mainly of very deep, well drained Hayesville and similar soils. It is on ridges and side slopes in the Sauratown Mountain Range in the central part of the county. Stones on the surface average about 15 inches in diameter and are 5 to 60 feet apart. Most areas are elongated and irregular in width and range from 5 to 40 acres in size.

Typically, the surface layer is brown channery fine sandy loam 3 inches thick. The subsurface layer is strong brown channery fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, Sauratown, and Brevard soils. Ashe, Cowee, and Sauratown soils have a loamy subsoil and have bedrock at a depth of 20 to 40 inches. They are in scattered areas throughout the map unit. Brevard soils have a loamy subsoil and formed in colluvium, generally below the steeper slopes and small areas of rock outcrop. Included soils make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. A small acreage is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by chestnut oak, white oak, northern red oak, Virginia pine, eastern white pine, and yellow-

poplar. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. No major limitations affect woodland use and management. Loblolly pine and eastern white pine generally are recommended for planting.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. The slope, the hazard of erosion, and the large stones on the surface are the main management concerns. The large stones must be removed before the soil is cultivated. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The number of stones on the surface is the main limitation. The stones must be avoided or removed.

The slope is the main limitation affecting building site development. The slope and the moderate permeability are the main limitations on sites for septic tank absorption fields. Increasing the size of the absorption area can help to overcome the restricted permeability. The slope and the large stones on the surface are the main limitations affecting landscaping and recreational development.

The capability subclass is VIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6A.

HaD—Hayesville channery fine sandy loam, 15 to 25 percent slopes, very stony. This map unit consists mainly of very deep, well drained Hayesville and similar soils. It is on narrow ridges and on side slopes in the Sauratown Mountain Range in the central part of the county. Stones on the surface average about 15 inches in diameter and are 5 to 60 feet apart. Most areas are elongated and irregular in width and range from 5 to 60 acres in size.

Typically, the surface layer is brown channery fine sandy loam 3 inches thick. The subsurface layer is strong brown channery fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, Sauratown, and Brevard soils. Ashe, Cowee, and Sauratown soils have a loamy subsoil and have bedrock at a depth of 20 to 40 inches. They are in scattered areas throughout the map unit. Brevard soils have a loamy subsoil and formed in colluvium, generally below the steeper slopes and small areas of rock outcrop. Included soils make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as woodland. A small acreage is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by chestnut oak, white oak, northern red oak, Virginia pine, eastern white pine, and yellow-poplar. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. Loblolly pine and eastern white pine generally are recommended for planting. The slope and the hazard of erosion are the main management concerns.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. The slope, the hazard of erosion, and the large stones on the surface are the main management concerns. The large stones must be removed before the soil is cultivated. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The slope and the number of large stones on the surface are the main limitations. The stones must be avoided or removed.

The slope is the main limitation affecting building site development. The slope and the moderate permeability are the main limitations on sites for septic tank absorption fields. Increasing the size of the absorption area can help to overcome the restricted permeability. The slope and the large stones on the surface are the main limitations affecting landscaping and recreational development.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6R.

HaE—Hayesville channery fine sandy loam, 25 to 60 percent slopes, very stony. This map unit consists mainly of very deep, well drained Hayesville and similar soils. It is on side slopes in the Sauratown Mountain Range in the central part of the county. Stones on the surface average about 15 inches in diameter and are 5 to 60 feet apart. Most areas are elongated and irregular in width and range from 5 to 120 acres in size.

Typically, the surface layer is brown channery fine sandy loam 3 inches thick. The subsurface layer is

strong brown channery fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, Sauratown, and Brevard soils and small areas of rock outcrop. Ashe, Cowee, and Sauratown soils have a loamy subsoil and have bedrock at a depth of 20 to 40 inches. They are in scattered areas throughout the map unit. Brevard soils have a loamy subsoil and formed in colluvium, generally below the steeper slopes and areas of rock outcrop. Inclusions make up about 20 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. Forested areas are commonly dominated by chestnut oak, white oak, northern red oak, Virginia pine, eastern white pine, and yellow-poplar. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. The slope and the hazard of erosion are the main management concerns. Loblolly pine and eastern white pine generally are recommended for planting.

This map unit is generally not used as cropland or pasture. The main management concerns are the slope, the hazard of erosion, and the large stones on the surface.

The slope is a severe limitation affecting building site development, recreational development, sanitary facilities, and landscaping. The large stones on the surface also are a limitation affecting landscaping.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6R.

HeB—Hayesville-Sauratown complex, 2 to 8 percent slopes. This map unit consists mainly of a very deep, well drained Hayesville soil and a moderately deep, well drained Sauratown soil. It is on low ridges and on side slopes in the Sauratown Mountain Range and on Brown Mountain in the central part of the county. The Hayesville soil makes up about 40 percent of the map unit, and the Sauratown soil makes up 35 percent. The two soils occur as areas so intricately mixed that mapping them separately was not practical at the scale of mapping. Most areas are elongated and irregular in width and range from 5 to 30 acres in size.

Typically, the surface layer of the Hayesville soil is brown fine sandy loam 3 inches thick. The subsurface layer is strong brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate in the Hayesville soil. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Sauratown soil is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate in the Sauratown soil. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe and Cowee soils and small areas of a soil that has bedrock within a depth of 20 inches. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a red, loamy subsoil and have partly weathered bedrock at a depth of 20 to 40 inches. Also included are small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

Tobacco is the main crop in this map unit. Corn, soybeans, and small grain are occasionally grown. The slope and the hazard of erosion in both soils and droughtiness because of low available water capacity in the Sauratown soil are the main management concerns. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. No major limitations affect management.

Forested areas of this map unit are commonly dominated by white oak, chestnut oak, northern red oak, scarlet oak, yellow-poplar, Virginia pine, and

eastern white pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. No major limitations affect woodland management. Loblolly pine and eastern white pine generally are recommended for planting.

A high content of clay and the moderate permeability in the Hayesville soil and the depth to bedrock in the Sauratown soil are the main limitations affecting building site development and sanitary facilities. The depth to bedrock in the Sauratown soil is the main limitation affecting recreational development.

The Hayesville soil is in capability subclass IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol in areas of this soil is 6A. The Sauratown soil is in capability subclass IIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol in areas of this soil is 2D.

HeC—Hayesville-Sauratown complex, 8 to 15 percent slopes. This map unit consists mainly of a very deep, well drained Hayesville soil and a moderately deep, well drained Sauratown soil. It is on low ridges and on foot slopes in the Sauratown Mountain Range and on Brown Mountain in the central part of the county. The Hayesville soil makes up about 40 percent of the map unit, and the Sauratown soil makes up 35 percent. The two soils occur as areas so intricately mixed that mapping them separately was not practical at the scale of mapping. Most areas are elongated and irregular in width and range from 5 to 100 acres in size.

Typically, the surface layer of the Hayesville soil is brown fine sandy loam 3 inches thick. The subsurface layer is strong brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate in the Hayesville soil. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Sauratown soil is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate in the Sauratown soil. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe and Cowee soils, small areas of a loamy soil that is more than 60 inches deep over bedrock, and small areas of a soil that has bedrock within a depth of 20 inches. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a red, loamy subsoil and have partly weathered bedrock at a depth of 20 to 40 inches. Also included are small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

Tobacco is the main crop in this map unit. Corn, soybeans, and small grain are occasionally grown. The slope, the hazard of erosion, and droughtiness in the Sauratown soil are the main management concerns. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. No major limitations affect management.

Forested areas of this map unit are commonly dominated by white oak, chestnut oak, northern red oak, scarlet oak, yellow-poplar, Virginia pine, and eastern white pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. No major limitations affect woodland management. Loblolly pine and eastern white pine generally are recommended for planting.

The slope of both soils, a high content of clay in the subsoil of the Hayesville soil, and the depth to bedrock in the Sauratown soil are the main limitations affecting building site development and sanitary facilities. The slope and the depth to bedrock are the main limitations affecting recreational development.

The capability subclass is IVe. Based on yellow-poplar as the indicator species, the woodland ordination symbol in areas of the Hayesville soil is 6A. Based on chestnut oak as the indicator species, the woodland ordination symbol in areas of the Sauratown soil is 2D.

HeD—Hayesville-Sauratown complex, 15 to 25 percent slopes. This map unit consists mainly of a very deep, well drained Hayesville soil and a moderately deep, well drained Sauratown soil. It is on low ridges and on side slopes and foot slopes in the Sauratown Mountain Range and on Brown Mountain in the central

part of the county. The Hayesville soil makes up about 40 percent of the map unit, and the Sauratown soil makes up 35 percent. The two soils occur as areas so intricately mixed that mapping them separately was not practical at the scale of mapping. Most areas are elongated and irregular in width and range from 5 to 100 acres in size.

Typically, the surface layer of the Hayesville soil is brown fine sandy loam 3 inches thick. The subsurface layer is strong brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate in the Hayesville soil. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Sauratown soil is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate in the Sauratown soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe and Cowee soils, small areas of a very deep soil that has a loamy subsoil, and small areas of a soil that has bedrock within a depth of 20 inches. Ashe soils have less clay in the soil than the Sauratown soil. Cowee soils have a red, loamy subsoil and have partly weathered bedrock at a depth of 20 to 40 inches. Also included are small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland or pasture. A few small areas are used as cropland.

Forested areas of this map unit are commonly dominated by white oak, chestnut oak, northern red oak, scarlet oak, yellow-poplar, Virginia pine, and eastern white pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The slope and the hazard of erosion are the main management concerns. Loblolly pine and eastern white pine generally are recommended for planting.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The slope is the main limitation.

Tobacco, corn, soybeans, and small grain are occasionally grown. The slope and the hazard of erosion in both soils and droughtiness in the Sauratown soil are the main management concerns. Conservation practices that help to control erosion and add organic matter to the surface layer are needed.

The slope of both soils, a high content of clay in the subsoil of the Hayesville soil, and the depth to bedrock in the Sauratown soil are the main limitations affecting building site development and sanitary facilities. The slope and the depth to bedrock are the main limitations affecting recreational development.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol in areas of the Hayesville soil is 6R. Based on chestnut oak as the indicator species, the woodland ordination symbol in areas of the Sauratown soil is 2R.

HeE—Hayesville-Sauratown complex, 25 to 60 percent slopes. This map unit consists mainly of a very deep, well drained Hayesville soil and a moderately deep, well drained Sauratown soil. It is on side slopes in the Sauratown Mountain Range and on Brown Mountain in the central part of the county. The Hayesville soil makes up about 40 percent of the map unit, and the Sauratown soil makes up 35 percent. The two soils occur as areas so intricately mixed that mapping them separately was not practical at the scale of mapping. Most areas are elongated and irregular in width and range from 5 to 300 acres in size.

Typically, the surface layer of the Hayesville soil is brown fine sandy loam 3 inches thick. The subsurface layer is strong brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 53 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red clay loam in the lower part. The underlying material to a depth of 65 inches is red saprolite that has a texture of loam.

Permeability is moderate in the Hayesville soil. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Sauratown soil is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and

brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate in the Sauratown soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe and Cowee soils, small areas of a very deep soil that has a loamy subsoil, and small areas of a soil that has bedrock within a depth of 20 inches. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a red, loamy subsoil and have partly weathered bedrock at a depth of 20 to 40 inches. Also included are small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. Forested areas are commonly dominated by white oak, chestnut oak, northern red oak, scarlet oak, yellow-poplar, Virginia pine, and eastern white pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The slope and the hazard of erosion are the main management concerns. Loblolly pine and eastern white pine generally are recommended for planting.

Because of the slope, this map unit is not generally used as cropland or pasture. The slope can result in the overturning of equipment.

The slope of both soils, excessive clay in the subsoil of the Hayesville soil, and the depth to bedrock in the Sauratown soil are the main limitations affecting building site development and sanitary facilities. The slope and the depth to bedrock are the main limitations affecting recreational development.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol in areas of the Hayesville soil is 6R. Based on chestnut oak as the indicator species, the woodland ordination symbol in areas of the Sauratown soil is 2R.

HoA—Hornsboro loam, 0 to 3 percent slopes, rarely flooded. This map unit consists mainly of very deep, somewhat poorly drained Hornsboro and similar soils. It is on stream terraces, mainly in the southern part of the county along the Dan River and Town Fork Creek. Most areas are irregular in shape and range from 5 to 90 acres in size.

Typically, the surface layer is dark grayish brown loam 3 inches thick. The subsurface layer is grayish brown loam 5 inches thick. The subsoil extends to a depth of more than 77 inches. It is pale brown loam in the upper part, light brownish gray and gray clay in the next part, and brownish yellow and light yellowish brown clay loam in the lower part.

Permeability is slow. Available water capacity is moderate. Surface runoff is slow. The hazard of erosion is slight. The shrink-swell potential is high in the subsoil. The depth to a seasonal high water table is 1.0 foot to 1.5 feet. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Dogue, Chewacla, Toccoa, and Riverview soils and small areas of a soil that is wetter than the Hornsboro soil. Dogue soils are better drained than the Hornsboro soil and are on the higher part of the landscape. Chewacla, Toccoa, and Riverview soils have a loamy subsoil and are in the areas nearest to the stream. Toccoa and Riverview soils are better drained than the Hornsboro soil. The wetter soil is on the slightly lower part of the landscape. Included soils make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as pasture. The rest is used mainly as woodland. A small acreage is used as cropland.

Where this map unit is used as pasture, tall fescue and ladino clover are the main forage plants. The wetness and the flooding are the main management concerns. A drainage system may be needed for optimum production.

Forested areas of this map unit are commonly dominated by willow oak, white oak, southern red oak, green ash, Virginia pine, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are river birch, flowering dogwood, sourwood, ironwood, and American holly. The wetness, the flooding, the seedling mortality rate, and plant competition are the main management concerns. Because of the wetness and the flooding, timber harvesting should be limited to dry periods. A drainage system is needed to increase the seedling survival rate during planting. Seedlings should be planted in a well prepared seedbed. Competing vegetation should be controlled or removed.

This map unit is occasionally used for corn, soybeans, or small grain. A drainage system is needed for optimum growth. Tobacco generally is not planted on this soil. The flooding and the slow removal of surface water result in drowning.

The wetness, the flooding, and shrinking and swelling are the main limitations affecting building site development, recreational development, and sanitary facilities.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

MaB2—Masada sandy clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of very deep, well drained Masada and similar soils. It is on high stream terraces scattered throughout the county. Erosion has removed 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width and range from 5 to 30 acres in size.

Typically, the surface layer is yellowish brown sandy clay loam 10 inches thick. The subsoil extends to a depth of 57 inches. It is clay. It is strong brown in the upper part, yellowish red in the next part, and red in the lower part. The underlying material to a depth of 75 inches is red clay loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is moderate in the subsoil. The depth to a seasonal high water table is more than 6 feet. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Cecil, Pacolet, Mayodan, and Dogue soils. Also included are small areas of a soil that has bedrock within 60 inches of the surface and small areas of a soil that has a loamy subsoil. Cecil, Pacolet, and Mayodan soils formed in residuum and are in scattered areas throughout the map unit. Cecil and Pacolet soils have a subsoil that is more friable than that of the Masada soil. Dogue soils are moderately well drained and are on the lower part of the landscape. Also included are some small areas of Masada soils that have many cobbles and pebbles in the surface layer. Included soils make up about 10 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

The main crops are tobacco, soybeans, corn, and small grain. The hazard of erosion, surface runoff, and the effects of past erosion are the main management concerns. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland management.

The moderate shrink-swell potential is the main limitation affecting building site development. The moderate permeability is a limitation on sites for septic tank absorption fields. The restricted permeability generally can be minimized by increasing the size of the absorption area. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

MaC2—Masada sandy clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of very deep, well drained Masada and similar soils. It is on high stream terraces scattered throughout the county. Erosion has removed 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width and range from 5 to 30 acres in size.

Typically, the surface layer is yellowish brown sandy clay loam 10 inches thick. The subsoil extends to a depth of 57 inches. It is clay. It is strong brown in the upper part, yellowish red in the next part, and red in the lower part. The underlying material to a depth of 75 inches is red clay loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to a seasonal high water table is more than 6 feet. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Cecil, Pacolet, Mayodan, and Dogue soils. Cecil, Pacolet, and Mayodan soils formed in residuum and are in scattered areas throughout the map unit. Cecil and Pacolet soils have a subsoil that is more friable than that of the Masada soil. Dogue soils are moderately well drained and are on the lower part of the landscape. Also included are small areas of a soil that has bedrock within a depth of 60 inches, small areas of a soil that has a loamy subsoil, and some small areas of Masada soils that have many cobbles and pebbles in the surface layer. Included soils make up about 10 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

The main crops are tobacco, soybeans, corn, and small grain. The hazard of erosion, surface runoff, and the effects of past erosion are the main management concerns. Maintaining good tilth is difficult because of

the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland management.

The slope and the moderate shrink-swell potential are the main limitations affecting building site development and recreational development. The slope and the moderate permeability are the main limitations on sites for septic tank absorption fields. The restricted permeability generally can be minimized by increasing the size of the absorption area. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

MnB—Mayodan fine sandy loam, 2 to 8 percent slopes. This map unit consists mainly of very deep, well drained Mayodan and similar soils. It is on broad ridges in the Triassic Basin, which is in the southeastern part of the county. Most areas are elongated and irregular in width and range from 10 to 500 acres in size.

Typically, the surface layer is dark brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 49 inches. It is yellowish brown and strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Masada, and Dogue soils, small areas of soils that have bedrock within a depth of 60 inches, small areas of soils that have a loamy subsoil, and small areas of moderately well drained soils. Pacolet soils have a subsoil that is more friable than that of the Mayodan soil. Masada and Dogue soils formed in old alluvium. Dogue soils are wetter than the Mayodan soil and are on the lower part of the landscape. The moderately well drained soils are in slight depressions and at the head of drainageways. The other included soils are in scattered areas throughout the map unit. Also included are some small areas of Mayodan soils that have many cobbles and pebbles in the surface layer. Included soils make up about 10 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland management.

Tobacco, soybeans, corn, and small grain are the main crops. Surface runoff and the hazard of erosion are the main management concerns. Conservation practices that help to control erosion are needed.

Where this map unit is used for pasture and hay, it is commonly planted to tall fescue and ladino clover. No major limitations affect this use.

The moderate shrink-swell potential is the main limitation affecting building site development. It generally can be overcome by installing reinforcement rods in the foundation. The moderate permeability is the main limitation on sites for septic tank absorption fields. It generally can be overcome by increasing the size of the absorption area. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

MnC—Mayodan fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of very deep, well drained Mayodan and similar soils. It is on ridges and side slopes in the Triassic Basin, which is in the southeastern part of the county. Most areas are elongated and irregular in width and range from 5 to 100 acres in size.

Typically, the surface layer is dark brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil

extends to a depth of 49 inches. It is yellowish brown and strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Masada, and Dogue soils, small areas of soils that have bedrock within a depth of 60 inches, small areas of soils that have a loamy subsoil, and small areas of moderately well drained soils. Pacolet soils have a subsoil that is more friable than that of the Mayodan soil. Masada and Dogue soils formed in old alluvium. Masada soils are on nose slopes, foot slopes, and toe slopes. Dogue soils are wetter than the Mayodan soil and are on the lower part of the landscape, generally on toe slopes. The moderately well drained soils are in slight depressions and at the head of drainageways. The other included soils are in scattered areas throughout the map unit. Also included are some small areas of Mayodan soils that have many cobbles and pebbles in the surface layer. Included soils make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland management.

Tobacco, soybeans, corn, and small grain are the main crops. The slope, surface runoff, and the hazard of erosion are the main management concerns. Conservation practices that help to control erosion are needed.

Where this map unit is used for pasture and hay, it is commonly planted to tall fescue and ladino clover. No major limitations affect this use.

The moderate shrink-swell potential and the slope are the main limitations affecting building site development. The moderate shrink-swell potential generally can be overcome by installing reinforcement rods in the foundation. The moderate permeability and the slope are the main limitations on sites for septic tank absorption fields. Increasing the size of the absorption area generally helps to overcome the restricted permeability. The slope is the main limitation affecting recreational development. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

MnD—Mayodan fine sandy loam, 15 to 25 percent slopes. This map unit consists mainly of very deep, well drained Mayodan and similar soils. It is on side slopes in the Triassic Basin, which is in the southeastern part of the county. Most areas are elongated and irregular in width and range from 5 to 100 acres in size.

Typically, the surface layer is dark brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 49 inches. It is yellowish brown and strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Pinkston, and Masada soils, small areas of soils that have bedrock within a depth of 60 inches, small areas of soils that have a loamy subsoil, and small areas of moderately well drained soils. Pacolet soils have a subsoil that is more friable than that of the Mayodan soil. They are around the edge of the unit in areas where crystalline bedrock is exposed through the Triassic sediments. Pinkston soils have a loamy subsoil and have bedrock within a depth of 40 inches. Masada soils formed in old alluvium and are on nose slopes, foot slopes, and toe slopes. The moderately well drained soils are at the head of drainageways. The other included soils are in scattered areas throughout the map unit. Also included are small areas of rock outcrop and small areas of Mayodan soils that have many cobbles and pebbles in the surface layer. Included areas make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood,

persimmon, American holly, and sassafras. The slope and the hazard of erosion are the main management concerns. The hazard of erosion can result in overturning of the equipment.

This map unit is occasionally used for tobacco, soybeans, corn, or small grain. The slope, surface runoff, and the hazard of erosion are the main management concerns. Conservation practices that help to control erosion are needed. Converting cropland to permanent plant cover, such as grasses or trees, helps to control the very severe hazard of erosion.

Where this map unit is used for pasture and hay, it is commonly planted to tall fescue and ladino clover. The slope and the hazard of erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

The slope is the main limitation affecting building site development and recreational development. The slope is a severe limitation on sites for septic tank absorption fields. Low strength and the slope are severe limitations on sites for local roads and streets.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9R.

MoB2—Mayodan sandy clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of very deep, well drained Mayodan and similar soils. It is on gently sloping, broad ridges in the Triassic Basin, which is in the southeastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width and range from 5 to 300 acres in size.

Typically, the surface layer is brown sandy clay loam 8 inches thick. The subsoil extends to a depth of 45 inches. It is strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Pinkston, Masada, and Dogue soils, small areas of soils that have bedrock within a depth of 60 inches, small areas of soils that have a loamy subsoil, and small areas of moderately well drained soils. Pacolet soils have a subsoil that is more friable than that of the Mayodan soil. They are in areas where crystalline bedrock is exposed through the Triassic sediments. Pinkston soils have a loamy subsoil and have bedrock within a depth of 40 inches. Masada and Dogue soils formed in old alluvium on the lower part of the landscape. Dogue soils are wetter than the Mayodan soil. The moderately well drained soils are in slight depressions and at the head of drainageways. The other included soils are in scattered areas throughout the map unit. Also included are some small areas of Mayodan soils that have many cobbles and pebbles in the surface layer. Included soils make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland. Many of the wooded areas were once cultivated but have been allowed to naturally revegetate to Virginia pine and shortleaf pine.

Tobacco, soybeans, corn, and small grain are the main crops. Surface runoff, the hazard of erosion, and the effects of past erosion are the main management concerns. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants where this map unit is used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The hazard of erosion, an equipment limitation caused by low strength, and the seedling mortality rate are the main management concerns.

The moderate shrink-swell potential is the main limitation affecting building site development. It generally can be overcome by installing reinforcement rods in the foundation. The moderate permeability is the main limitation on sites for septic tank absorption fields. It generally can be overcome by increasing the size of the absorption area. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IIIe. Based on loblolly pine

as the indicator species, the woodland ordination symbol is 8C.

MoC2—Mayodan sandy clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of very deep, well drained Mayodan and similar soils. It is on ridges and on side slopes in the Triassic Basin, which is in the southeastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width and range from 5 to 150 acres in size.

Typically, the surface layer is brown sandy clay loam 8 inches thick. The subsoil extends to a depth of 45 inches. It is strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Pinkston, Masada, and Dogue soils, small areas of soils that have bedrock within a depth of 60 inches, small areas of soils that have a loamy subsoil, and small areas of moderately well drained soils. Pacolet soils have a subsoil that is more friable than that of the Mayodan soil. They are in areas where crystalline bedrock is exposed through the Triassic sediments. Pinkston soils have a loamy subsoil and have bedrock within a depth of 40 inches. Masada and Dogue soils formed in old alluvium on the lower part of the landscape. Dogue soils are wetter than the Mayodan soil. The moderately well drained soils are in slight depressions and at the head of drainageways. The other included soils are in scattered areas throughout the map unit. Also included are some small areas of Mayodan soils that have many cobbles and pebbles in the surface layer. Included soils make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland. Many of the wooded areas were once cultivated but have been allowed to naturally revegetate to Virginia pine and shortleaf pine.

Tobacco, soybeans, corn, and small grain are the main crops. The slope, surface runoff, the hazard of erosion, and the effects of past erosion are the main management concerns. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The hazard of erosion, an equipment limitation caused by low strength, and the seedling mortality rate are the main management concerns.

The moderate shrink-swell potential and the slope are the main limitations affecting building site development. The moderate shrink-swell potential generally can be overcome by installing reinforcement rods in the foundation. The moderate permeability and the slope are the main limitations on sites for septic tank absorption fields. The restricted permeability generally can be overcome by increasing the size of the absorption area. The slope is the main limitation affecting recreational development. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8C.

MoD2—Mayodan sandy clay loam, 15 to 25 percent slopes, eroded. This map unit consists mainly of very deep, well drained Mayodan and similar soils. It is on side slopes in the Triassic Basin, which is in the southeastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are long and narrow and range from 5 to 150 acres in size.

Typically, the surface layer is brown sandy clay loam 8 inches thick. The subsoil extends to a depth of 45 inches. It is strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-

swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Pinkston, and Masada soils, small areas of soils that have bedrock within a depth of 60 inches, small areas of soils that have a loamy subsoil, and small areas of moderately well drained soils. Pacolet soils have a subsoil that is more friable than that of the Mayodan soil. They are in areas where crystalline bedrock is exposed through the Triassic sediments. Pinkston soils have a loamy subsoil and have bedrock within a depth of 40 inches. Masada soils formed in old alluvium, generally on the lower part of the landscape. The moderately well drained soils are at the head of drainageways. The other included soils are in scattered areas throughout the map unit. Also included are some small areas of Mayodan soils that have many cobbles and pebbles in the surface layer. Included soils make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. A small acreage is used as cropland or pasture. Some of the wooded areas were once cultivated or were clearcut or burned. As a result, erosion has occurred.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The slope, a very severe hazard of erosion, an equipment limitation, and the seedling mortality rate are the main management concerns.

In cultivated areas, tobacco, soybeans, corn, and small grain are the main crops. The slope, surface runoff, the hazard of erosion, and the effects of past erosion are the main management concerns. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed. Converting cropland to permanent plant cover, such as pasture, hayland, or woodland, helps to control the very severe hazard of erosion.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The slope, the hazard of erosion, and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

The slope is the main limitation affecting building site development and recreational development. The slope is a severe limitation on sites for septic tank absorption fields. Low strength and the slope are severe limitations on sites for local roads and streets.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

MpE—Mayodan-Pinkston complex, 25 to 45 percent slopes. This map unit consists mainly of a very deep, well drained Mayodan soil and a moderately deep, well drained to excessively drained Pinkston soil. It is on side slopes in the Triassic Basin, which is in the southeastern part of the county. The Mayodan soil makes up about 40 percent of the map unit, and the Pinkston soil makes up 35 percent. The two soils occur as areas so intricately mixed that mapping them separately was not practical at the scale of mapping. The Mayodan soil is typically in the less sloping areas, and the Pinkston soil is typically in the steeper and more convex areas. Most areas are long and narrow and range from 5 to 150 acres in size.

Typically, the surface layer of the Mayodan soil is dark brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 49 inches. It is yellowish brown and strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of loam.

Permeability is moderate in the Mayodan soil. Available water capacity is high. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Pinkston soil is reddish brown loam 5 inches thick. The subsoil is reddish brown loam 8 inches thick. The underlying material to a depth of 21 inches is dark reddish brown gravelly loam. Partly weathered, maroon and gray bedrock extends to a depth of 28 inches. Hard siltstone is at a depth of about 28 inches.

Permeability is moderately rapid in the Pinkston soil. Available water capacity is very low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included with these soils in mapping are small areas of Pacolet, Poindexter, and Masada soils, and small areas of a soil that has a clayey subsoil and has bedrock within a depth of 60 inches. Also included are small areas of rock outcrop. Pacolet soils are very deep over bedrock and have a subsoil that is more friable than that of the Mayodan soil. Poindexter soils have a loamy subsoil and have soft bedrock at a depth of 20 to 40 inches. Pacolet and Poindexter soils are in areas where crystalline bedrock is exposed through the Triassic sediments. Masada soils formed in old alluvium and are on the lower side slopes. The soil that has a clayey subsoil and the rock outcrop are in scattered areas throughout the map unit. Inclusions make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as pasture.

Forested areas of this map unit are commonly dominated by white oak, southern red oak, yellow-poplar, Virginia pine, and shortleaf pine. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The slope and the hazard of erosion of both soils and the windthrow hazard on the Pinkston soil are the main management concerns.

Because of the slope, this map unit generally is not used as cropland. Erosion is a very severe hazard if the map unit is cultivated. It can result in the overturning of equipment.

Where this map unit is used as pasture, it is commonly planted to tall fescue and ladino clover. The slope and the hazard of erosion are the main management concerns. The slope can result in the overturning of equipment.

This map unit generally is not used for urban development. The slope of both soils and the depth to bedrock of the Pinkston soil are the main limitations affecting building site development, recreational development, and septic tank absorption fields. Low strength and the slope are severe limitations on sites for local roads and streets.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of the Mayodan soil is 9R. Based on southern red oak as the indicator species, the woodland ordination symbol in areas of the Pinkston soil is 2R.

MyB—Mayodan-Urban land complex, 2 to 10 percent slopes. This map unit occurs mainly as areas of a very deep, well drained Mayodan soil intermingled with areas of Urban land. The unit is on ridges and side slopes, mainly in and around Walnut Cove. It is about 60 percent Mayodan soil and 30 percent Urban land. The Mayodan soil and Urban land occur as areas so small or so intricately mixed that mapping them separately is not practical at the scale of mapping. Most areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer of the Mayodan soil is dark brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 49 inches. It is yellowish brown and strong brown sandy clay loam in the upper part, yellowish red and reddish brown clay in the next part, and reddish brown clay loam in the lower part. The underlying material to a depth of 62 inches is dark reddish brown saprolite that has a texture of clay loam.

Permeability is moderate in the Mayodan soil. Available water capacity is high. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is moderate in the subsoil. The depth to bedrock is more than 60 inches.

The Urban land consists of areas where the original soils have been cut, filled, graded, or paved. The soil properties have been so altered that a soil series is not recognized. These areas are now used as sites for buildings and other closely spaced structures, roads and streets, or parking lots. The extent of site modification varies greatly.

Included in this unit in mapping are a few small areas of Pinkston soils and a soil that has a clayey subsoil and has bedrock within a depth of 60 inches. These soils are in scattered areas throughout the map unit. They make up about 10 percent of the map unit.

The moderate shrink-swell potential is the main limitation affecting building site development. The moderate permeability is the main limitation on sites for septic tank absorption fields. It generally can be overcome by increasing the size of the absorption area. The high content of clay is a limitation on sites for sanitary facilities. The slope is the main limitation affecting recreational development. Low strength is a moderate limitation on sites for local roads and streets. The rate of surface runoff is higher than that on other Mayodan soils because of the areas covered by buildings and other structures, roads and streets, and parking lots.

The capability subclass is IIe in areas of the Mayodan soil and VIIIs in areas of Urban land. A woodland ordination symbol has not been assigned to this map unit.

PaC—Pacolet gravelly fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of very

deep, well drained Pacolet and similar soils. It is on narrow ridges and on strongly sloping side slopes, mainly near the base of the Sauratown Mountain Range, but areas are scattered throughout the county. Most areas are elongated and irregular in width and range from 5 to 40 acres in size.

Typically, the surface layer is dark grayish brown gravelly fine sandy loam 2 inches thick. The subsurface layer is yellowish brown gravelly fine sandy loam 3 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Cecil, Masada, and Rion soils. Cecil and Masada soils have a subsoil that is thicker than that of the Pacolet soil. Masada soils have a subsoil that is more plastic than that of the Pacolet soil. Rion soils have a loamy subsoil. Cecil and Rion soils are in scattered areas throughout the map unit. Masada soils are on nose slopes, foot slopes, and the lower side slopes of remnant high stream terraces. Also included are small areas of rock outcrop and small areas of a soil that has bedrock within a depth of 60 inches. Inclusions make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as woodland. A small acreage is used for cropland, hay, or pasture.

Forested areas of this map unit are commonly dominated by white oak, northern red oak, chestnut oak, yellow-poplar, shortleaf pine, and Virginia pine. Loblolly pine is common in areas where trees are planted. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain laurel, and rhododendron. No major limitations affect woodland management.

This map unit is occasionally used for crops, such as tobacco, soybeans, corn, and small grain. The main management concerns are surface runoff, the hazard of erosion, and the small stones in the surface layer. Conservation practices that help to control erosion and add organic matter are needed. Pebbles in the surface layer hinder cultivation and increase the wear on equipment but do not seriously affect management.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. No major limitations affect this use.

The slope and the moderate permeability are moderate limitations on sites for septic tank absorption fields. The restricted permeability generally can be overcome by increasing the size of the absorption area. The slope is a moderate limitation on sites for sanitary landfills, dwellings, and small commercial buildings. The slope and the many small stones are moderate limitations affecting landscaping and recreational development.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

PaD—Pacolet gravelly fine sandy loam, 15 to 25 percent slopes. This map unit consists mainly of very deep, well drained Pacolet and similar soils. It is on very narrow ridges and on side slopes, mainly near the base of the Sauratown Mountain Range, but areas are scattered throughout the county. Most areas are elongated and irregular in width and range from 5 to 30 acres in size.

Typically, the surface layer is dark grayish brown gravelly fine sandy loam 2 inches thick. The subsurface layer is yellowish brown gravelly fine sandy loam 3 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Masada and Rion soils. Masada soils have a subsoil that is thicker and more plastic than that of the Pacolet soil. They are on nose slopes, foot slopes, and the lower side slopes of remnant high stream terraces. Rion soils have a loamy subsoil and are in scattered areas throughout the map unit. Also included are small areas of rock outcrop and small areas of a soil that has bedrock within a depth of 60 inches. Inclusions make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as woodland. A very small acreage is used for cropland, hay, or pasture.

Forested areas of this map unit are commonly dominated by white oak, northern red oak, chestnut oak, yellow-poplar, shortleaf pine, and Virginia pine. Loblolly pine is common in areas where trees are planted. The most common understory plants are flowering dogwood, sourwood, blackgum, mountain

laurel, and rhododendron. The slope and the hazard of erosion are the main management concerns.

This map unit generally is not used for cultivated crops. The slope, the hazard of erosion, and the abundance of small stones in the surface layer are the main management concerns. Conservation practices that help to control erosion and add organic matter are needed. The many pebbles in the surface layer hinder cultivation and increase the wear on equipment but do not seriously affect management. Converting cropland to permanent plant cover, such as pasture, hayland, or woodland, helps to control the severe hazard of erosion.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The slope is the main limitation affecting this use. Care is needed to prevent the overturning of equipment.

The slope is the main limitation on sites for buildings, sanitary facilities, and recreational development. The hazard of erosion is very severe on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

PcB2—Pacolet sandy clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of very deep, well drained Pacolet and similar soils. It is on ridges throughout the county. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width and range from 5 to 300 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 36 inches. It is red clay in the upper part and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Cecil, Masada, Rion, Wilkes, and Zion soils. Cecil soils have a subsoil that is thicker than that of the Pacolet soil. Masada soils formed in old alluvium and have a subsoil that is thicker and more plastic than that of the Pacolet soil. Rion soils have a loamy subsoil. Wilkes soils have bedrock within a depth of 20 inches, and Zion soils have bedrock within a depth of 40 inches. Also included are small areas of a soil that has many flakes of mica in the subsoil and small areas of rock outcrop. Masada soils are in flat to slightly concave areas. The other inclusions are in scattered areas throughout the map unit. Also included are some small areas of Pacolet soils that have many pebbles and cobbles in the surface layer and small areas of soils that mainly support hardwood forests, are slightly eroded, and have a surface layer of fine sandy loam. Inclusions make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland. Many of the wooded areas were once cultivated but have been allowed to naturally revegetate to Virginia pine.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. The main management concerns are the hazard of erosion and the effects of past erosion. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The hazard of erosion is the main management concern.

This map unit has few limitations affecting homesite development. It is moderately limited as a site for septic tank absorption fields because of the moderate permeability. The restricted permeability generally can be overcome by increasing the size of the absorption area. The hazard of erosion is moderate on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

PcC2—Pacolet sandy clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of very

deep, well drained Pacolet and similar soils. It is on narrow ridges and on side slopes throughout the county. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are elongated and irregular in width or are long and narrow. They range from 5 to 1,000 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 36 inches. It is red clay in the upper part and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Cecil, Masada, Rion, Wedowee, Wilkes, and Zion soils. Cecil soils have a subsoil that is thicker than that of the Pacolet soil. They are in the broader areas. Masada soils formed in old alluvium and have a subsoil that is thicker and more plastic than that of the Pacolet soil. Rion soils have a loamy subsoil, and Wedowee soils have a subsoil that is yellower than that of the Pacolet soil. Wilkes soils have bedrock within a depth of 20 inches, and Zion soils have bedrock within a depth of 40 inches. Also included are small areas of soils that have many flakes of mica in the subsoil and small areas of rock outcrop. The inclusions are dominantly in scattered areas throughout the map unit. Masada soils are on nose slopes, foot slopes, and the lower side slopes of remnant high stream terraces. Also included are some small areas of Pacolet soils that have many cobbles or pebbles in the surface layer and small areas of soils that mainly support hardwood forests, are slightly eroded, and have a surface layer of fine sandy loam. Inclusions make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland. Many of the wooded areas were once cultivated but have been allowed to naturally revegetate to Virginia pine.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. The main management concerns affecting agricultural uses are surface runoff, the hazard of erosion, and the effects of past erosion. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Tall fescue and ladino clover are the main forage plants where this map unit is used for pasture and hay. The hazard of erosion and the effects of past erosion are the main management concerns when pasture and hayland are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The hazard of erosion is the main management concern.

This map unit is moderately limited as a site for most urban uses, including homesite development, because of the slope. It is moderately limited as a site for septic tank absorption fields because of the slope and the moderate permeability. Increasing the size of the absorption field generally overcomes the restricted permeability. The slope is the main limitation affecting recreational development. Low strength and the slope are moderate limitations on sites for local roads and streets. The hazard of erosion is severe on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

PcD2—Pacolet sandy clay loam, 15 to 25 percent slopes, eroded. This map unit consists mainly of very deep, well drained Pacolet and similar soils. It is on side slopes and very narrow ridges throughout the county. Erosion has removed about 25 to 75 percent of the original surface layer. Most areas are long and narrow and range from 5 to 450 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 36 inches. It is red clay in the upper part and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Wateree, Masada, Poindexter, Rion, Wedowee, and

Wilkes soils. Wateree and Poindexter soils have a loamy subsoil and have partly weathered bedrock at a depth of 20 to 40 inches. Wilkes soils have partly weathered bedrock within a depth of 20 inches. Masada soils formed in old alluvium and have a subsoil that is thicker and more plastic than that of the Pacolet soil. Rion soils have a loamy subsoil. Wedowee soils have a subsoil that is yellower than that of the Pacolet soil. Also included are small areas of a soil that has many flakes of mica in the subsoil and small areas of rock outcrop. The inclusions are dominantly in scattered areas throughout the map unit. Masada soils are on nose slopes, foot slopes, and the lower side slopes of remnant high stream terraces. Also included are some small areas of Pacolet soils that have many cobbles or pebbles in the surface layer and small areas of soils that mainly support hardwood forests, are slightly eroded, and have a surface layer of fine sandy loam. Inclusions make up about 35 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture. Many of the wooded areas were once cultivated or used as pasture but have been allowed to naturally revegetate to Virginia pine.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The slope and the effects of past erosion severely limit woodland management. The erosion hazard, the equipment limitation, and the seedling mortality rate are moderate.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. The main management concerns are surface runoff, the hazard of erosion, and the effects of past erosion. Maintaining good tilth is difficult because of the surface layer of sandy clay loam. As this layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed. Converting cropland to permanent plant cover, such as pasture, hayland, or woodland, helps to control the very severe hazard of erosion.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The slope, the hazard of erosion, and the effects of past erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion. Care is needed to prevent the overturning of equipment.

This map unit is severely limited as a site for all urban uses because of the slope. The hazard of erosion is very severe on all construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6R.

PuB—Pacolet-Urban land complex, 2 to 8 percent slopes. This map unit occurs mainly as areas of a very deep, well drained, and eroded Pacolet soil intermingled with areas of Urban land. The unit is on broad ridges in and around the towns of King, Pinnacle, and Germanton. It is about 60 percent Pacolet soil and 35 percent Urban land. The Pacolet soil and Urban land occur as areas so small and so intricately mixed that mapping them separately is not practical at the scale of mapping. Most areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer of the Pacolet soil is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 36 inches. It is red clay in the upper part and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

The Urban land consists of areas where the original soil has been cut, filled, graded, or paved. The soil properties have been so altered that a soil series is not recognized. These areas are now used as sites for buildings and other closely spaced structures, roads and streets, or parking lots. The extent of site modification varies greatly.

Included in this unit in mapping are small areas of Cecil, Masada, Rion, and Wilkes soils. Cecil and Masada soils have a subsoil that is thicker than that of the Pacolet soil. Masada soils formed in old alluvium and have a subsoil that is more plastic than that of the Pacolet soil. Rion soils have a loamy subsoil. Wilkes soils have a subsoil that is yellower and more plastic than that of the Pacolet soil and have bedrock within a depth of less than 20 inches. Masada soils are in flat to slightly concave areas that are protected from erosion. Cecil, Rion, and Wilkes soils are in scattered areas throughout the map unit. Included soils make up about 5 percent of the map unit.

Figure 8.—A subdivision in an area of Pacolet-Urban land complex, 8 to 15 percent slopes.

No major limitations affect building site development or recreational development. The moderate permeability is a limitation on sites for septic tank absorption fields. It generally can be overcome by extending the size of the absorption area. Low strength is a moderate limitation on sites for local roads and streets. The rate of surface runoff commonly is higher than that on other Pacolet soils because of the areas covered by buildings and other structures, roads and streets, and parking lots. The increased rate of runoff causes a severe hazard of erosion on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is IIIe in areas of the Pacolet soil and VIIIs in areas of Urban land. A woodland ordination symbol has not been assigned to this map unit.

PuC—Pacolet-Urban land complex, 8 to 15 percent slopes. This map unit occurs mainly as areas of a very deep, well drained, and eroded Pacolet soil intermingled with areas of Urban land (fig. 8). The unit is on narrow ridges and on side slopes in and around the towns of King, Pinnacle, and Germanton. It is about 60 percent Pacolet soil and 35 percent Urban land. The Pacolet soil and Urban land occur as areas so small or so intricately mixed that mapping them separately is not practical at the scale of mapping. Most areas are long and narrow or irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer of the Pacolet soil is yellowish red sandy clay loam 8 inches thick. The subsoil extends to a depth of 36 inches. It is red clay in the upper part and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

The Urban land consists of areas where the original soil has been cut, filled, graded, or paved. The soil properties have been so altered that a soil series is not recognized. These areas are now used as sites for

buildings and other closely spaced structures, roads and streets, or parking lots. The extent of site modification varies greatly.

Included in this unit in mapping are small areas of Cecil, Masada, Rion, and Wilkes soils. Cecil and Masada soils have a subsoil that is thicker than that of the Pacolet soil. Masada soils formed in old alluvium and have a subsoil that is more plastic than that of the Pacolet soil. Rion soils have a loamy subsoil. Wilkes soils have a subsoil that is yellower and more plastic than that of the Pacolet soil and have bedrock within a depth of less than 20 inches. Masada soils are on nose slopes, foot slopes, or toe slopes. Cecil soils are in the flatter areas. Rion and Wilkes soils are in scattered areas throughout the map unit. Included soils make up about 5 percent of the map unit.

The slope is a moderate limitation affecting most building site development, recreational development, and sanitary facilities and a severe limitation on sites for small commercial buildings. The moderate permeability is a limitation on sites for septic tank absorption fields. It generally can be overcome by increasing the size of the absorption area. Low strength is a moderate limitation on sites for local roads and streets. The rate of surface runoff is commonly higher than that on other Pacolet soils because of the areas covered by buildings and other structures, roads and streets, and parking lots. The increased rate of runoff causes a severe hazard of erosion on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The capability subclass is VIe in areas of the Pacolet soil and VIIIs in areas of Urban land. A woodland ordination symbol has not been assigned to this map unit.

PwC—Pacolet-Wilkes complex, 8 to 15 percent slopes. This map unit consists mainly of a very deep, well drained Pacolet soil and a shallow, well drained Wilkes soil. It is on narrow ridges and on side slopes, mainly in the north-central part of the county but in scattered areas throughout the county. The Pacolet soil makes up about 40 percent of the map unit, and the Wilkes soil makes up 35 percent. The two soils occur as areas so intricately mixed that they cannot be separated at the scale of mapping. Most areas are elongated and irregular in width and range from 5 to 60 acres in size.

Typically, the surface layer of the Pacolet soil is brown fine sandy loam 3 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate in the Pacolet soil. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Wilkes soil is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is yellowish brown sandy clay loam. The lower part is yellowish brown clay loam that has pockets of green, white, yellow, and gray saprolite that has a texture of loam. The underlying material to a depth of 43 inches is multicolored, partly weathered bedrock. Hard bedrock is at a depth of about 43 inches.

Permeability is moderately slow in the Wilkes soil. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to soft bedrock is 10 to 20 inches.

Included in this unit in mapping are small areas of Rion, Wateree, Poindexter, and Zion soils. Rion, Wateree, and Poindexter soils have a loamy subsoil. Rion soils are more than 60 inches deep over bedrock. Poindexter, Wateree, and Zion soils have bedrock at a depth of 20 to 40 inches. Zion soils have a clayey subsoil. Also included are small areas of a soil that has many flakes of mica in the subsoil, some small areas of Pacolet and Wilkes soils that have many pebbles or cobbles in the surface layer, and small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture. Most of the areas were once cultivated or used as pasture but have been allowed to naturally revegetate to Virginia pine.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The windthrow hazard on the shallow Wilkes soil is the main limitation affecting woodland management.

Where this map unit is cultivated, the main crops are tobacco, small grain, corn, and soybeans. Some extensively cultivated areas are moderately eroded. These areas generally are less than 5 acres in size. Surface runoff and the hazard of erosion are the main management concerns. Low available water capacity is a limitation on the Wilkes soil. Maintaining good tilth can

be difficult in the moderately eroded areas. As the surface layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The hazard of erosion is the main management concern when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

The slope is the main limitation affecting building site development on the Pacolet soil. The slope and the moderate permeability are moderate limitations on sites for septic tank absorption fields. The restricted permeability generally can be overcome by increasing the size of the absorption area. The slope is a moderate limitation affecting recreational development.

The depth to bedrock and the slope are the main limitations affecting building site development on the Wilkes soil. The depth to bedrock is a severe limitation on sites for sanitary facilities and recreational development. The hazard of erosion is severe on construction sites where the plant cover has been removed. Erosion-control measures are needed.

The Pacolet soil is in capability subclass IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of this soil is 8A. The Wilkes soil is in capability subclass VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of this soil is 7D.

PwD—Pacolet-Wilkes complex, 15 to 25 percent slopes. This map unit consists mainly of a very deep, well drained Pacolet soil and a shallow, well drained Wilkes soil. It is on narrow ridges and on side slopes, mainly in the north-central part of the county but in scattered areas throughout the county. The Pacolet soil makes up about 40 percent of the map unit, and the Wilkes soil makes up 30 percent. The two soils occur as areas so intricately mixed that they cannot be separated at the scale of mapping. Most areas are elongated and irregular in width and range from 5 to 50 acres in size.

Typically, the surface layer of the Pacolet soil is brown fine sandy loam 3 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate in the Pacolet soil. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Wilkes soil is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is yellowish brown sandy clay loam. The lower part is yellowish brown clay loam that has pockets of green, white, yellow, and gray saprolite that has a texture of loam. The underlying material to a depth of 43 inches is multicolored, partly weathered bedrock. Hard bedrock is at a depth of about 43 inches.

Permeability is moderately slow in the Wilkes soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is moderate in the subsoil. The depth to soft bedrock is 10 to 20 inches.

Included in this unit in mapping are small areas of Rion, Wateree, Poindexter, and Zion soils. Rion, Wateree, and Poindexter soils have a loamy subsoil. Rion soils are more than 60 inches deep over bedrock. Poindexter, Wateree, and Zion soils have bedrock at a depth of 20 to 40 inches. Zion soils have a clayey subsoil. Also included are some small areas of a soil that has many flakes of mica in the subsoil, some small areas of Pacolet and Wilkes soils that have many pebbles or cobbles in the surface layer, and small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 30 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture. Most of the areas were once cultivated or used as pasture but have been allowed to naturally revegetate to Virginia pine.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The slope and the hazard of erosion on both soils and the windthrow hazard on the shallow Wilkes soil are the main management concerns.

Where this map unit is cultivated, the main crops are tobacco, small grain, corn, and soybeans. The slope, surface runoff, and the hazard of erosion are the main management concerns. Low available water capacity is a limitation on the Wilkes soil. Maintaining good tilth can be difficult in the moderately eroded areas. As the

surface layer dries after a hard rain, a crust commonly forms. Clods form if the soil is worked during wet periods. The cloddiness causes difficulties in seedbed preparation and can hinder germination and result in poor or uneven crop growth. Conservation practices that help to control erosion and add organic matter are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The slope and the hazard of erosion are the main management concerns when pasture and hay are becoming established. Once established, the permanent plant cover is very effective in controlling erosion.

The slope of both soils and the shallowness to bedrock in the Wilkes soil are the main limitations affecting building site development, recreational development, and sanitary facilities. The slope is the main limitation on sites for local roads and streets.

The Pacolet soil is in capability subclass VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of this soil is 8R. The Wilkes soil is capability subclass VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of this soil is 7R.

PxE—Poindexter fine sandy loam, 25 to 60 percent slopes. This map unit consists mainly of moderately deep, well drained Poindexter and similar soils. It is on side slopes scattered throughout the county. Some of the larger areas are east of King and east of Danbury. Most areas are long and narrow and range from 5 to 130 acres in size.

Typically, the surface layer is dark brown fine sandy loam 2 inches thick. The subsurface layer is dark yellowish brown fine sandy loam 6 inches thick. The subsoil to a depth of 20 inches is dark yellowish brown clay loam. The underlying material extends to a depth of 30 inches. It is yellow, brown, and green saprolite that has a texture of fine sandy loam. Partly weathered bedrock is at a depth of about 30 inches. Hard bedrock is at a depth of about 54 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to soft bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Wateree, Pacolet, Rion, and Wilkes soils. Wateree soils have less clay in the subsoil than the Poindexter soil. Pacolet and Rion soils are more than 60 inches deep over bedrock. Pacolet soils have a red, clayey subsoil. Wilkes soils have bedrock within a depth of 20 inches. The included soils are in scattered areas throughout the map unit. Also included are a few small areas of severely eroded Poindexter soils and a few small areas of soils where many pebbles or cobbles are in the surface layer. Included soils make up about 30 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. Common trees are Virginia pine, chestnut oak, southern red oak, and white oak. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are American holly, flowering dogwood, and sourwood. The slope, the hazard of erosion, and the equipment limitation are the main management concerns. Low available water capacity is a moderate limitation on south-facing slopes.

A few of the less sloping areas in this map unit are used as pasture. Good management practices are essential to prevent severe erosion.

This map unit generally is not used for crops, building sites, sanitary facilities, or recreational development because of the slope and the depth to bedrock.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 5R.

RnB—Rion fine sandy loam, 2 to 8 percent slopes. This map unit consists mainly of very deep, well drained Rion and similar soils. It is on broad ridges, mainly in the northwestern part of the county. Most areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam 8 inches thick. The subsoil extends to a depth of 26 inches. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow and yellowish brown fine sandy loam.

Permeability is moderate. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Poindexter, and Wilkes soils. Pacolet soils have a clayey subsoil. Poindexter soils have bedrock at a depth of 20 to 40 inches, and Wilkes soils have bedrock within a depth of 20 inches. Also included are small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

Tobacco, corn, soybeans, and small grain are the main crops. The hazard of erosion, surface runoff, and

the low available water capacity are the main management concerns. Minimum tillage practices that maintain crop residue on the surface and a cropping system based on grasses help to reduce surface runoff and increase the amount of water available to plants during the growing season.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. No major limitations affect this use, but droughtiness may be a slight limitation during dry periods.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, southern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland use and management.

The instability of cutbanks in shallow excavations is the main limitation affecting building site development. Seepage is a severe limitation on sites for sanitary landfills and sewage lagoons. No major limitations affect recreational development.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

RnC—Rion fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of very deep, well drained Rion and similar soils. It is on narrow ridges and on side slopes, mainly in the northwestern part of the county. Most areas are elongated and irregular in width and range from 5 to 100 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam 8 inches thick. The subsoil extends to a depth of 26 inches. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow and yellowish brown fine sandy loam.

Permeability is moderate. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Poindexter, Wilkes, Chewacla, Riverview, and Toccoa soils. Pacolet soils have a clayey subsoil. Poindexter soils have bedrock at a depth of 20 to 40 inches, and Wilkes soils have bedrock within a depth of 20 inches. Chewacla, Riverview, and Toccoa soils formed in alluvium and are on flood plains. Also included are small areas of rock outcrop. Inclusions dominantly are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

Tobacco, corn, soybeans, and small grain are the main crops. The slope, surface runoff, low available water capacity, and the susceptibility to erosion are the main management concerns. Minimum tillage practices that maintain crop residue on the surface and a cropping system based on grasses help to reduce surface runoff, control erosion, and increase the amount of water available to plants during the growing season.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The hazard of erosion, surface runoff, and droughtiness during dry periods are the main management concerns when pasture and hay are becoming established.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, southern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland use and management.

The slope and the instability of cutbanks are the main management concerns affecting building site development. The slope and seepage are the main limitations on sites for sanitary facilities. The slope is the main limitation affecting recreational development.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

RnD—Rion fine sandy loam, 15 to 25 percent slopes. This map unit consists mainly of very deep, well drained Rion and similar soils. It is on side slopes, mainly in the northwestern part of the county. Most areas are long and narrow and range from 5 to 70 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 26 inches. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow and yellowish brown fine sandy loam.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Poindexter, Wilkes, Chewacla, Riverview, and

Toccoa soils. Pacolet soils have a clayey subsoil. Poindexter soils have bedrock at a depth of 20 to 40 inches, and Wilkes soils have bedrock within a depth of 20 inches. Chewacla, Riverview, and Toccoa soils formed in alluvium and are on flood plains. Also included are small areas of rock outcrop. Inclusions dominantly are in scattered areas throughout the map unit. They make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, southern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The slope and the hazard of erosion are the main management concerns.

Where this map unit is cultivated, tobacco, corn, soybeans, and small grain are the main crops. The slope, surface runoff, low available water capacity, and the susceptibility to erosion are the main management concerns. Minimum tillage practices that maintain crop residue on the surface and a cropping system based on grasses help to reduce surface runoff, control erosion, and increase the rate of water infiltration and the amount of water available to plants during the growing season.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. The hazard of erosion, surface runoff, and droughtiness during dry periods are the main management concerns when pasture and hay are becoming established.

The slope and the instability of cutbanks are the main management concerns affecting building site development. The slope and seepage are the main limitations on sites for sanitary facilities. The slope is the main limitation affecting recreational development.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

RpE—Rion, Pacolet, and Wateree soils, 25 to 60 percent slopes. This map unit consists mainly of very deep, well drained Rion and Pacolet soils and a moderately deep, well drained Wateree soil on side slopes throughout the county. The Rion soil makes up about 40 percent of the map unit, the Pacolet soil makes up 25 percent, and the Wateree soil makes up 25 percent. Mapped areas generally have all three soils, but some have only one or two of the soils. The three soils can occur on any part of the map unit, but the Pacolet soil is dominantly on the upper slopes, on head slopes, and in other less sloping areas. The Wateree soil is dominantly in the steeper areas and is adjacent to areas of rock outcrop. The Rion soil is commonly throughout the map unit. Many of the steeper areas of this map unit are along the Dan River and have 10 percent or more rock outcrop. Most areas are long and narrow and range from 5 to 300 acres in size.

Typically, the surface layer of the Rion soil is dark grayish brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 26 inches. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow and yellowish brown fine sandy loam.

Permeability is moderate in the Rion soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Pacolet soil is dark grayish brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 3 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish red sandy clay loam in the upper part, red clay in the next part, and red sandy clay loam in the lower part. The underlying material to a depth of 65 inches is yellowish red saprolite that has a texture of sandy loam.

Permeability and available water capacity are moderate in the Pacolet soil. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Wateree soil is dark grayish brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 34 inches. It is brown fine sandy loam in the upper part and strong brown channery fine sandy loam in the lower part. The underlying material to a depth of 37 inches is strong brown saprolite that has a texture of channery fine sandy loam. Multicolored, partly weathered bedrock is at a depth of 37 to 42 inches, and hard bedrock is at a depth of about 42 inches.

Permeability is moderately rapid in the Wateree soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this map unit are small areas of Masada, Poindexter, Wilkes, Chewacla, Riverview, and Toccoa soils. Masada soils formed in old alluvium. They are on nose slopes, foot slopes, and the lower side slopes. The moderately deep Poindexter and shallow Wilkes

soils formed in areas of more basic bedrock and are in scattered areas throughout the map unit. Chewacla, Riverview, and Toccoa soils formed in alluvium and are on flood plains. Also included are small areas of rock outcrop and small areas where many cobbles and pebbles are in the surface layer. Included areas make up about 10 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. A small acreage is used as pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, white oak, northern red oak, southern red oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, American holly, and sassafras. The slope, surface runoff, and the hazard of erosion are the main management concerns. The slope can result in the overturning of equipment. Seedlings should be planted by hand on carefully selected sites.

A few of the less sloping areas of this map unit are used as pasture. Good management practices are essential to control the very severe hazard of erosion.

This map unit generally is not used as cropland. Where this map unit is cultivated, the hazard of erosion is very severe. The slope can result in the overturning of equipment.

This map unit generally is not used for building sites, recreational development, or sanitary facilities because of the slope.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R in areas of the Rion and Pacolet soils and 7R in areas of the Wateree soil.

RtA—Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded. This map unit consists mainly of a very deep, well drained Riverview soil and a very deep, well drained and moderately well drained Toccoa soil on flood plains throughout the county. The Riverview soil makes up about 50 percent of this map unit, and the Toccoa soil makes up 40 percent. Mapped areas generally have both Riverview and Toccoa soils, but in a given area they may have only one of these soils. The Toccoa soil generally is closer to the stream and is between areas of the Riverview soil and the stream. In some areas the Riverview soil is adjacent to the stream. This map unit generally occurs as long, narrow bands and ranges from 5 to 500 acres in size.

Typically, the surface layer of the Riverview soil is dark yellowish brown loam 8 inches thick. The subsoil extends to a depth of 46 inches. It is loam. It is brown in the upper part and yellowish brown in the lower part. The underlying material to a depth of 62 inches is dark yellowish brown loam.

Permeability is moderate in the Riverview soil. Available water capacity is high. Surface runoff is slow in bare or unprotected areas. The hazard of erosion is slight. The shrink-swell potential is low in the subsoil. The depth to a seasonal high water table is 3 to 5 feet. The depth to bedrock is more than 60 inches.

Typically, the surface layer of the Toccoa soil is dark brown fine sandy loam 9 inches thick. The underlying material extends to a depth of 60 inches. It is brown fine sandy loam in the upper part, strong brown sandy loam and fine sandy loam in the next part, and strong brown loamy fine sand in the lower part.

Permeability is moderately rapid in the Toccoa soil. Available water capacity is moderate. Surface runoff is slow in bare or unprotected areas. The hazard of erosion is slight. The shrink-swell potential is low in the subsoil. The depth to a seasonal high water table is 2.5 to 5.0 feet. The depth to bedrock is more than 60 inches.

Included in this map unit are small areas of Chewacla, Dogue, and Hornsboro soils and small areas of a soil that is sandier than the major soils. Chewacla and Hornsboro soils are wetter than the major soils. Hornsboro and Dogue soils have a clayey subsoil. Chewacla, Hornsboro, and Dogue soils generally are intermingled with areas of the Riverview soil in that part of the unit that is farthest from the stream. The sandier soil is adjacent to the stream and is along small ridges within the map unit. Included soils make up about 10 percent of the map unit.

Most of the acreage in this map unit is used as cropland. The rest is used as woodland or pasture.

Where this map unit is cultivated, the main crops are tobacco, corn, soybeans, and small grain. The occasional flooding is the main hazard. Crop production can be increased by controlling flooding. Crops that are planted in concave areas tend to drown during wet periods. Tobacco is especially susceptible to drowning.

Forested areas are dominated by American sycamore, green ash, sweetgum, yellow-poplar, and eastern cottonwood. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are switchcane, honeysuckle, poison ivy, and river birch. The main management concerns are the flooding, which limits the use of equipment, the seedling mortality rate, and plant competition. High-quality seedlings should be planted in a well prepared seedbed to ensure seedling survival. Controlling or removing competing vegetation helps to overcome plant competition.

Where this map unit is used for pasture and hay, tall

fescue and ladino clover are the main forage plants. The flooding is a hazard affecting livestock.

This map unit generally is not used for building site development and sanitary facilities because of the wetness and the flooding. The flooding is a moderate hazard on sites for playgrounds and a severe hazard on sites for camp areas.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 11W in areas of the Riverview soil and 9A in areas of the Toccoa soil.

RuE—Rock outcrop-Ashe complex, 10 to 80 percent slopes, extremely bouldery. This map unit consists mainly of intermingled areas of Rock outcrop and a moderately deep, somewhat excessively drained Ashe soil. Rock outcrop is made up mainly of quartzite gneiss. This map unit is on ridges and side slopes in the Sauratown Mountain Range in the central part of the county. Rock fragments on the Ashe soil range from channers to boulders, average about 24 inches across, and are 6 to 20 feet apart. Rock outcrop makes up about 45 percent of the map unit, and the Ashe soil makes up 35 percent. Rock outcrop and the Ashe soil occur as areas so intricately mixed that mapping them separately was not practical at the scale of mapping. The steeper parts of the map unit generally are Rock outcrop. The less sloping areas are about 50 percent Rock outcrop. Most areas of this map unit are elongated and irregular in width and range from 5 to 300 acres in size.

Typically, the surface layer of the Ashe soil is channery fine sandy loam 9 inches thick. It is dark brown in the upper part and dark yellowish brown in the lower part. The subsoil extends to a depth of 27 inches. It is dark yellowish brown channery fine sandy loam. The underlying material to a depth of 33 inches is brownish yellow very flaggy fine sandy loam. Hard quartzite gneiss bedrock is at a depth of about 33 inches.

Permeability is moderately rapid in the Ashe soil. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this map unit are small areas of Sauratown, Cowee, Hayesville, and Greenlee soils and small areas of a soil that has bedrock within a depth of 20 inches. Sauratown and Cowee soils have more clay in the subsoil than the Ashe soil. Cowee soils are redder than the Ashe soil. Hayesville soils have a clayey subsoil that is redder than that of the Ashe soil. Hayesville and Greenlee soils are more than 60 inches deep over bedrock. Greenlee soils formed in colluvium at the base of the Rock outcrop. Sauratown, Cowee, and Hayesville soils and the soil that has bedrock within a depth of 20 inches are in scattered areas throughout the map unit. Included soils make up about 20 percent of the map unit.

Nearly all of this map unit is wooded. The dominant trees are chestnut oak, scarlet oak, pitch pine, Table Mountain pine, Virginia pine, and eastern white pine. The most common understory plants are mountain laurel, rhododendron, flowering dogwood, sourwood, and wild blueberry. The unit generally is not used for timber production. The main management concerns are the slope, the hazard of erosion, the windthrow hazard, and the seedling mortality rate. Also, the trees are subject to wind shear. Eastern white pine generally is recommended for planting.

The use of this map unit for cultivated crops, hay, or pasture is impractical. The main management concerns are the slope, the hazard of erosion, the Rock outcrop, the abundance of rock fragments on the surface, and droughtiness.

This map unit generally is not used as sites for buildings, sanitary facilities, or recreational development. The slope, the depth to bedrock, and the abundance of large stones are the main limitations.

The capability subclass is VIIIs in areas of Rock outcrop and VIIs in areas of the Ashe soil. Based on chestnut oak as the indicator species, the woodland ordination symbol is 3R in areas of the Ashe soil.

SaC—Sauratown channery fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of moderately deep, well drained Sauratown and similar soils. It is on ridges and side slopes in the Sauratown Mountain Range in the central part of the county. Most areas are elongated and irregular in width and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, and Hayesville soils. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a subsoil that is redder than that of the

Sauratown soil and have partly weathered bedrock at a depth of 20 to 40 inches. Hayesville soils have a clayey subsoil that is redder than that of the Sauratown soil and have bedrock below a depth of 60 inches. Also included are small areas of a soil that has bedrock within a depth of 20 inches and small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Chestnut oak is the dominant species in forested areas of this map unit. Other species include white oak, scarlet oak, Virginia pine, Table Mountain pine, and pitch pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. Low available water capacity and the windthrow hazard are the main management concerns. The quality of the timber in many areas of this soil is low because of past management practices. Eastern white pine and loblolly pine generally are recommended for planting.

A small acreage of this map unit is used for tobacco, gardens, hay, or pasture. The hazard of erosion and low available water capacity are the main management concerns affecting cultivated crops.

The depth to bedrock is the main limitation affecting building site development and sanitary facilities. The slope and small stones on the surface are the main limitations affecting recreational development.

The capability subclass is IVe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2D.

SaD—Sauratown channery fine sandy loam, 15 to 25 percent slopes. This map unit consists mainly of moderately deep, well drained Sauratown and similar soils. It is on ridges and side slopes in the Sauratown Mountain Range in the central part of the county. Most areas are elongated and irregular in width and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, and Hayesville soils. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a subsoil that is redder than that of the Sauratown soil and have partly weathered bedrock at a depth of 20 to 40 inches. Hayesville soils have a clayey subsoil that is redder than that of the Sauratown soil and have bedrock below a depth of 60 inches. Also included are small areas of a soil that has bedrock within a depth of 20 inches and small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Chestnut oak is the dominant species in forested areas of this map unit. Other species include white oak, scarlet oak, Virginia pine, Table Mountain pine, and pitch pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The slope, the hazard of erosion, the seedling mortality rate, and the windthrow hazard are the main management concerns. The quality of the timber in many areas of this soil is low because of past management practices and wind shear on the higher ridges. Eastern white pine and loblolly pine generally are recommended for planting.

A small acreage of this map unit is used for tobacco, gardens, hay, or pasture. The slope, the hazard of erosion, and low available water capacity are the main management concerns.

The depth to bedrock and the slope are the main limitations affecting building site development and sanitary facilities. The slope and small stones on the surface are the main limitations affecting recreational development.

The capability subclass is VIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

SaE—Sauratown channery fine sandy loam, 25 to 60 percent slopes. This map unit consists mainly of moderately deep, well drained Sauratown and similar soils. It is on side slopes in the Sauratown Mountain Range in the central part of the county. Most areas are elongated and irregular in width and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss

bedrock is at a depth of about 31 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, Hayesville, Brevard, and Greenlee soils. Also included are small areas of a soil that has bedrock within a depth of 20 inches and small areas of rock outcrop. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a subsoil that is redder than that of the Sauratown soil and have partly weathered bedrock at a depth of 20 to 40 inches. Hayesville soils have a clayey subsoil that is redder than that of the Sauratown soil. Hayesville, Brevard, and Greenlee soils have bedrock below a depth of 60 inches. Brevard and Greenlee soils formed in colluvium and are along drainageways and at the base of rock outcrop and the steep slopes. The other inclusions are in scattered areas throughout the map unit. Inclusions make up about 20 percent of the map unit.

Nearly all of the acreage in this map unit is used as woodland. Chestnut oak is the dominant species. Other species include white oak, scarlet oak, Virginia pine, Table Mountain pine, and pitch pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The main management concerns are the slope, the seedling mortality rate, the windthrow hazard, and the hazard of erosion. The quality of the timber in many areas of this soil is low because of past management practices and wind shear on the higher ridges and slopes. Eastern white pine and loblolly pine generally are recommended for planting.

This map unit generally is not used for cropland, hay, or pasture. The slope, the hazard of erosion, and low available water capacity are the main management concerns.

The depth to bedrock and the slope are severe limitations affecting building site development and sanitary facilities. The slope and small stones on the surface are limitations affecting recreational development.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

SuC—Sauratown channery fine sandy loam, 8 to 15 percent slopes, very stony. This map unit consists mainly of moderately deep, well drained Sauratown and similar soils. It is on ridges and side slopes in the Sauratown Mountain Range in the central part of the county. Rock fragments on the surface range in size from boulders to channers, average about 20 inches in diameter, and are 3 to 30 feet apart. Most areas are elongated and irregular in width and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe, Cowee, and Hayesville soils. Ashe soils have less clay in the subsoil than the Sauratown soil. Cowee soils have a subsoil that is redder than that of the Sauratown soil and have partly weathered bedrock at a depth of 20 to 40 inches. Hayesville soils have a clayey subsoil that is redder than that of the Sauratown soil and have bedrock below a depth of 60 inches. Also included are small areas of a soil that has bedrock within a depth of 20 inches and small areas of rock outcrop. Inclusions are in scattered areas throughout the map unit. They make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Chestnut oak is the dominant species in forested areas of this map unit. Other species include white oak, Virginia pine, Table Mountain pine, and pitch pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The main limitations affecting woodland management are the large stones on the surface, the seedling mortality rate, and the windthrow hazard. The large stones hinder the use of heavy equipment during harvesting and replanting. Seedlings should be planted by hand on carefully selected sites. Eastern white pine and loblolly pine generally are recommended for planting.

This map unit generally is not used as cropland. The slope, surface runoff, the hazard of erosion, and the abundance of large stones on the surface are the main management concerns. The larger stones have been removed from the surface of a few small areas. These areas are used for tobacco.

Where this map unit is used as pasture, many of the larger stones have been removed from the surface. Tall fescue and ladino clover are the main forage plants.

The slope, depth to bedrock, and the abundance of large stones on the surface are the main limitations affecting building site development, recreational development, and sanitary facilities.

The capability subclass is VIs. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2D.

SuD—Sauratown channery fine sandy loam, 15 to 25 percent slopes, very stony. This map unit consists mainly of moderately deep, well drained Sauratown and similar soils. It is on ridges and side slopes in the Sauratown Mountain Range in the central part of the county. Rock fragments on the surface range in size from boulders to channers, average about 20 inches in diameter, and are 3 to 30 feet apart. Most areas are elongated and irregular in width and range from 5 to 60 acres in size.

Typically, the surface layer is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe, Hayesville, Brevard, and Greenlee soils. Also included are small areas of soils that have soft bedrock below a depth of 20 inches, small areas of soils that have bedrock within a depth of 20 inches, and small areas of rock outcrop. Ashe soils have less clay in the subsoil than the Sauratown soil. Hayesville and Brevard soils have a subsoil that is redder than that of the Sauratown soil and have bedrock below a depth of 60 inches. Hayesville soils have a clayey subsoil. Greenlee soils have more than 35 percent rock fragments in the subsoil. Brevard and Greenlee soils formed in colluvium and are on small benches and fans and along small drainageways. The other inclusions are in scattered areas throughout the map unit. Inclusions make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Chestnut oak is the dominant species in forested areas of this map unit. Other species include white oak, Virginia pine, Table Mountain pine, and pitch pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The main management concerns are the slope, the hazard of erosion, the large stones on the surface, the seedling mortality rate, and the windthrow hazard. The slope and the abundance of large stones limit the use of heavy equipment in harvesting and replanting. Seedlings should be planted by hand on carefully selected sites. Eastern white pine and loblolly pine generally are recommended for planting.

This map unit generally is not used as cropland. The slope, surface runoff, the hazard of erosion, and the abundance of large stones on the surface are the main management concerns.

Where this map unit is used as pasture, many of the larger rocks have been removed from the surface. Tall fescue and ladino clover are the main forage plants.

The slope, depth to bedrock, and the abundance of large stones on the surface are the main limitations affecting building site development, recreational development, and sanitary facilities.

The capability subclass is VIs. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

SuE—Sauratown channery fine sandy loam, 25 to 60 percent slopes, very stony. This map unit consists mainly of moderately deep, well drained Sauratown and similar soils. It is on side slopes in the Sauratown Mountain Range in the central part of the county. Rock fragments on the surface range in size from boulders to channers, average about 20 inches in diameter, and are 3 to 30 feet apart. Most areas are elongated and irregular in width and range from 10 to 250 acres in size.

Typically, the surface layer is dark brown channery fine sandy loam 2 inches thick. The subsurface layer is yellowish brown channery fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is yellowish brown channery fine sandy loam in the upper part and yellowish brown and brownish yellow channery sandy clay loam in the lower part. Hard quartzite gneiss bedrock is at a depth of about 31 inches.

Permeability is moderate. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Included in this unit in mapping are small areas of Ashe, Hayesville, Brevard, and Greenlee soils. Also included are small areas of soils that have soft bedrock below a depth of 20 inches, small areas of soils that have bedrock within a depth of 20 inches, and small areas of rock outcrop. Ashe soils have less clay in the subsoil than the Sauratown soil. Hayesville and Brevard soils have a subsoil that is redder than that of the

Sauratown soil and have bedrock below a depth of 60 inches. Hayesville soils have a clayey subsoil. Brevard and Greenlee soils formed in colluvium and alluvium and have bedrock at a depth of more than 60 inches. They are along small drainageways and on benches and foot slopes. The other inclusions are in scattered areas throughout the map unit. Inclusions make up about 25 percent of the map unit.

Nearly all of this map unit is used as woodland. A few small areas where the larger stones have been removed are used as pasture.

Chestnut oak is the dominant species in forested areas of this map unit. Other species include white oak, Virginia pine, Table Mountain pine, and pitch pine. The most common understory plants are sourwood, flowering dogwood, mountain laurel, and rhododendron. The main management concerns are the slope, the hazard of erosion, the large stones on the surface, the seedling mortality rate, and the windthrow hazard. The slope and the abundance of large stones limit the use of heavy equipment in harvesting and replanting. Conventional harvesting methods generally can be used over carefully chosen routes among the stones and on the steeper slopes. Seedlings should be planted by hand on carefully selected sites. Eastern white pine and loblolly pine generally are recommended for planting.

This map unit generally is not used for cropland, hay, or pasture. The main management concerns are the slope, the hazard of erosion, and the abundance of large stones on the surface.

The slope, depth to bedrock, and the abundance of large stones on the surface are the main limitations affecting building site development, recreational development, and sanitary facilities.

The capability subclass is VIIs. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

Ud—Udorthents, loamy. This map unit consists mainly of areas in which the natural soils have been altered by earthmoving operations. These areas are identified on the detailed soil maps as borrow pits, fill areas, cut and fill, landfills, and quarries. A few small areas of borrow pits are identified by the map unit symbol. A spot symbol is used to identify areas of borrow pits that are too small to identify on the detailed soil maps. The altered soils are dominantly loamy. The thickness, the underlying material, and the slope vary greatly. Small areas of undisturbed natural soils or small areas of exposed bedrock are in some of the mapped areas.

In areas of borrow pits, the original soil and much of the underlying material have been removed for use as material for buildings, roads and streets, or dam construction. The cuts are 1 foot to 20 feet deep. The remaining surface is smooth to irregular and consists mainly of slightly weathered to extremely weathered bedrock and spoil material. Borrow pits range from 3 to 30 acres in size.

Included with the borrow pits in mapping are small areas of intermittent ponded water and piles of fill material that have been pushed aside during excavation.

Most of the borrow pits that have been idle for a year or more have naturally reseeded to wild grasses, weeds, and Virginia pine. Physical properties for plant growth are poor. The rooting depth is generally shallow, and the available water capacity, fertility, and content of organic matter are low. Major reclamation generally is needed if these areas are to economically support plant growth or to develop for other purposes.

In fill areas, the original soil has been covered to a depth of 2 to 20 feet by dominantly loamy spoil material that has been obtained offsite. These areas are mainly level or nearly level. They are used to enhance the landscape, to develop in the future, or to dispose of unwanted soil material, rocks, stumps, and other woody material. Fill areas range from 3 to 5 acres in size.

Fill areas are sown to grasses, planted to trees, or allowed to naturally reseed to wild grasses, weeds, and Virginia pine. The physical properties vary with the kind of material used in the fill, but enough soil material generally is present in fill areas to support vegetation. Initial and subsequent applications of lime and fertilizer help to establish and maintain plant cover.

In cut and fill areas, the landscape has been modified by cutting the soil material out of the higher areas and depositing it in the lower areas. Cutting and subsequent filling ranges from about 2 to 10 feet in depth. Cut and fill areas range from 5 to 70 acres in size.

Included in cut and fill areas are small areas of undisturbed natural soil, areas of soil from which only part of the upper layer has been removed, and areas in which only a thin layer of fill covers the natural soil.

Cut and fill areas generally are nearly level and gently sloping. They are used to enhance the landscape or to develop in the future. The physical properties of the soil material vary greatly but generally are adequate to support vegetation on most of the unit. Cut and fill areas generally are planted to grasses or trees or are naturally reseeded to wild grasses, weeds, and Virginia pine. Initial and subsequent applications of lime and fertilizer help to establish and maintain plant cover.

Landfills are areas where the soil has been excavated to some depth, then refilled with alternate layers of solid refuse and soil material. The area is then covered by about 2 feet of soil material and seeded to

grasses. These areas are generally sloping after the final cover and grading. Landfills range from 10 to 35 acres in size.

Included in landfills are small areas of undisturbed natural soil, generally along the edge of the unit, along access routes, and in areas used for building sites and equipment storage.

The physical properties of the soil material used as cover for landfills vary greatly. Initial and subsequent applications of lime and fertilizer help to establish and maintain plant cover.

In quarries, the entire soil has been removed as overburden, and part of the underlying bedrock has been used for crushed stone. Quarries generally consist of nearly vertical sidewalls and irregular bases that have piles of spoil material scattered along the bottom and on the adjacent surface layer. Quarries range from 10 to 70 feet in depth and from 3 to 10 acres in size.

Areas in which quarrying is still in progress have very little vegetation. Abandoned quarries occasionally have standing water in the lowest areas of the pits. Virginia pine, wild grasses, and weeds are scattered in areas of bedrock, mainly in cracks. The soil material in the spoil areas generally has poor physical properties but generally supports Virginia pine, wild grasses, and weeds. Most areas of the quarries have not been reclaimed but remain as they were when the quarries were abandoned.

Onsite investigation is needed before the use and management of any of the areas in the map unit are planned.

The capability subclass is VIIe. A woodland ordination symbol has not been assigned to this map unit.

WeB—Wedowee loam, 2 to 8 percent slopes. This map unit consists mainly of very deep, well drained Wedowee and similar soils. It is on ridges, primarily in the southeastern part of the county. Some of the larger areas are southeast of Walnut Cove. Most areas are elongated and irregular in width and range from 5 to 25 acres in size.

Typically, the surface layer is brown loam 3 inches thick. The subsurface layer is brownish yellow loam 6 inches thick. The subsoil extends to a depth of 36 inches. It is reddish yellow loam in the upper part, strong brown clay in the next part, and yellowish red clay in the lower part. The underlying material to a depth of 60 inches is yellow loam and saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is moderate. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Rion, Wilkes, and Zion soils. Pacolet soils have a subsoil that is redder than that of the Wedowee soil. Rion and Wilkes soils have a loamy subsoil. Wilkes soils have bedrock within a depth of 20 inches, and Zion soils have bedrock within a depth of 40 inches. Also included are small areas of a soil that has a subsoil that is thicker than that of the Wedowee soil, small areas of a soil that has many flakes of mica in the subsoil, and some small areas of Wedowee soils that have many pebbles and cobbles in the surface layer. Included soils are in scattered areas throughout the map unit. They make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland management.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. Surface runoff and the hazard of erosion are the main management concerns. Conservation practices that help to control erosion are needed.

Tall fescue and ladino clover are the main forage plants where this soil is used for pasture and hay. No major limitations affect this use.

No major limitations affect building site development and recreational development. The moderate permeability is the main limitation on sites for septic tank absorption fields. Increasing the size of the absorption area generally helps to overcome the restricted permeability. Low strength is a moderate limitation on sites for local roads and streets.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

WeC—Wedowee loam, 8 to 15 percent slopes. This map unit consists mainly of very deep, well drained Wedowee and similar soils. It is on ridges and side slopes, primarily in the southeastern part of the county. Some of the larger areas are southeast of Walnut Cove. Most areas are elongated and irregular in width and range from 5 to 120 acres in size.

Typically, the surface layer is brown loam 3 inches

thick. The subsurface layer is brownish yellow loam 6 inches thick. The subsoil extends to a depth of 36 inches. It is reddish yellow loam in the upper part, strong brown clay in the next part, and yellowish red clay in the lower part. The underlying material to a depth of 60 inches is yellow loam and saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Pacolet, Rion, Wilkes, and Zion soils. Pacolet soils have a subsoil that is redder than that of the Wedowee soil. Rion and Wilkes soils have a loamy subsoil. Wilkes soils have bedrock within a depth of 20 inches, and Zion soils have bedrock within a depth of 40 inches. Also included are small areas of a soil that has a subsoil that is thicker than that of the Wedowee soil, small areas of a soil that has many flakes of mica in the subsoil, and some small areas of Wedowee soils that have many pebbles and cobbles in the surface layer. Included soils are in scattered areas throughout the map unit. They make up about 15 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. No major limitations affect woodland management.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. Surface runoff and the hazard of erosion are the main management concerns. Conservation practices that help to control erosion are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. No major limitations affect this use.

The slope is a moderate limitation affecting building site development and recreational development. The moderate permeability is the main limitation on sites for septic tank absorption fields. Increasing the size of the absorption area generally helps to overcome the restricted permeability. Low strength and the slope are moderate limitations on sites for local roads and streets.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

WeD—Wedowee loam, 15 to 25 percent slopes. This map unit consists mainly of very deep, well drained Wedowee and similar soils. It is on side slopes, primarily in the southeastern part of the county. Some of the larger areas are southeast of Walnut Cove. Most areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is brown loam 3 inches thick. The subsurface layer is brownish yellow loam 6 inches thick. The subsoil extends to a depth of 36 inches. It is reddish yellow loam in the upper part, strong brown clay in the next part, and yellowish red clay in the lower part. The underlying material to a depth of 60 inches is yellow loam and saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is low in the subsoil. The depth to bedrock is more than 60 inches.

Included in this unit in mapping are small areas of Masada, Pacolet, Rion, Wilkes, and Zion soils. Also included is a soil that has a red, clayey subsoil and has bedrock at a depth of 20 to 40 inches. Masada and Pacolet soils have a subsoil that is redder than that of the Wedowee soil. Rion and Wilkes soils have a loamy subsoil. Wilkes soils have bedrock within a depth of 20 inches, and Zion soils have bedrock within a depth of 40 inches. Also included are small areas of a soil that has many flakes of mica in the subsoil and some small areas of Wedowee soils that have many pebbles and cobbles in the surface layer. Masada soils are on nose slopes and foot slopes. The other included soils are in scattered areas throughout the map unit. Included soils make up about 25 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are commonly dominated by Virginia pine, white oak, northern red oak, chestnut oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, persimmon, American holly, and sassafras. The slope and the hazard of erosion are the main management concerns.

Where this map unit is cultivated, the main crops are tobacco, soybeans, corn, and small grain. Surface runoff and the hazard of erosion are the main management concerns. Conservation practices that help to control erosion are needed.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The slope,

surface runoff, and the hazard of erosion are the main management concerns.

The slope is a severe limitation affecting building site development and recreational development. The slope and the moderate permeability are limitations on sites for septic tank absorption fields. Increasing the size of the absorption area helps to overcome the restricted permeability. The slope is a severe limitation on sites for local roads and streets.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

WkC—Wilkes fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of shallow, well drained Wilkes and similar soils. It is on narrow ridges and on side slopes scattered throughout the county. Most areas are irregular in shape and range from 3 to 70 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is yellowish brown sandy clay loam. The lower part is yellowish brown clay loam that has pockets of green, white, yellow, and gray saprolite that has a texture of loam. The underlying material to a depth of 43 inches is green, white, yellow, and gray weathered bedrock. Hard bedrock is at a depth of about 43 inches.

Permeability is moderately slow. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to soft bedrock is 10 to 20 inches.

Included in this unit in mapping are small areas of Pacolet, Rion, Wateree, Poindexter, and Zion soils. Pacolet and Rion soils are more than 60 inches deep over bedrock. Wateree, Poindexter, and Zion soils have bedrock at a depth of 20 to 40 inches. Also included in some mapped areas are small areas of rock outcrop and some small areas of Wilkes soils that have many pebbles or cobbles in the surface layer. Inclusions are in scattered areas throughout the map unit. They make up about 20 percent of the map unit.

Most areas of this map unit are used as cropland or pasture. The rest is used as woodland.

Tobacco, corn, soybeans, and small grain are the main crops. Low available water capacity, surface runoff, and the severe hazard of erosion are the main management concerns. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer are needed. Cropland should be converted to permanent plant cover, such as pasture or woodland, where the fields are too small to apply conservation practices.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. No major limitations affect this use.

Forested areas of this map unit are dominated by Virginia pine, shortleaf pine, northern red oak, southern red oak, white oak, and post oak. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, American holly, and sourwood. The windthrow hazard is the main management concern.

This map unit is severely limited as a site for most buildings, recreational development, and sanitary facilities because of the shallowness to bedrock. The slope, shrinking and swelling, and the depth to bedrock are moderate limitations on sites for dwellings without basements and for local roads and streets.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7D.

WkD—Wilkes fine sandy loam, 15 to 25 percent slopes. This map unit consists mainly of shallow, well drained Wilkes and similar soils. It is on narrow ridges and on side slopes scattered throughout the county. Most areas are elongated and irregular in width and range from 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam 4 inches thick. The subsoil extends to a depth of 16 inches. The upper part is yellowish brown sandy clay loam. The lower part is yellowish brown clay loam that has pockets of green, white, yellow, and gray saprolite that has a texture of loam. The underlying material to a depth of 43 inches is green, white, yellow, and gray weathered bedrock. Hard bedrock is at a depth of about 43 inches.

Permeability is moderately slow. Available water capacity is low. Surface runoff is rapid in bare or unprotected areas. The hazard of erosion is very severe. The shrink-swell potential is moderate in the subsoil. The depth to soft bedrock is 10 to 20 inches.

Included in this unit in mapping are small areas of Pacolet, Rion, Wateree, Poindexter, and Zion soils. Pacolet and Rion soils are more than 60 inches deep over bedrock. Wateree, Poindexter, and Zion soils have bedrock at a depth of 20 to 40 inches. Also included are small areas of rock outcrop and some small areas of Wilkes soils that have many pebbles or cobbles in the surface layer. Inclusions are scattered throughout the map unit. They make up about 20 percent of the map unit.

Most of the acreage in this map unit is used as woodland. The rest is used as cropland or pasture.

Forested areas of this map unit are dominated by Virginia pine, shortleaf pine, northern red oak, southern red oak, white oak, and post oak. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, American holly, and sourwood. The hazard of erosion, the equipment limitation, and the windthrow hazard are the main management concerns.

Tobacco, corn, soybeans, and small grain are the main crops. Low available water capacity, surface runoff, and the very severe hazard of erosion are the main management concerns. Conservation practices that help to control erosion and increase the content of organic matter in the surface layer should be used. Cropland should be converted to permanent plant cover, such as pasture or woodland, where the fields are too small to apply conservation practices.

Tall fescue and ladino clover are the main forage plants in areas used for pasture and hay. The slope, the hazard of erosion, and low available water capacity are the main management concerns.

This map unit is severely limited as a site for most buildings, recreational development, and sanitary facilities because of the slope and the depth to bedrock. The slope is a severe limitation on sites for local roads and streets.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7R.

ZwC—Zion-Wilkes complex, 8 to 15 percent slopes. This map unit consists of a moderately deep, well drained Zion soil and a shallow, well drained Wilkes soil. It is on narrow ridges and on side slopes in scattered areas throughout the county. The Zion soil makes up about 50 percent of the map unit, and the Wilkes soil makes up 40 percent. The two soils occur as areas so intricately mixed that they cannot be separated at the scale of mapping. Most areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer of the Zion soil is dark yellowish brown fine sandy loam 9 inches thick. The subsoil is clay 22 inches thick. The upper part is brownish yellow, and the lower part is yellowish brown and has pockets of brown, yellow, and green saprolite that has a texture of fine sandy loam. Weathered bedrock is at a depth of 31 to 39 inches. Hard bedrock is at a depth of about 39 inches.

Permeability is slow in the Zion soil. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is high in the subsoil. The depth to hard bedrock is 20 to 40 inches.

Typically, the surface layer of the Wilkes soil is yellowish brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is yellowish brown sandy clay loam. The lower part is yellowish brown clay loam that has pockets of green, white, yellow, and gray saprolite that has a texture of loam. The underlying material to a depth of 43 inches is green, white, yellow, and gray weathered bedrock. Hard bedrock is at a depth of about 43 inches.

Permeability is moderately slow in the Wilkes soil. Available water capacity is low. Surface runoff is medium in bare or unprotected areas. The hazard of erosion is severe. The shrink-swell potential is moderate in the subsoil. The depth to soft bedrock is 10 to 20 inches.

Included in this map unit are a few small areas of Pacolet, Rion, Wedowee, and Poindexter soils. Also included is a soil that is similar to the Zion soil but is more than 40 inches deep over bedrock. Poindexter soils have a loamy subsoil and have bedrock at a depth of 20 to 40 inches. The other included soils have bedrock at a depth of more than 60 inches. Also included are some small areas that have many pebbles in the surface layer. Included soils are in scattered areas throughout the map unit. They make up about 10 percent of the map unit.

Most of the acreage in this map unit is used as cropland or pasture. The rest is used as woodland.

Tobacco, corn, soybeans, and small grain are the main crops. Low available water capacity and the hazard of erosion are the main management concerns. Tobacco that is planted in the flatter areas of the Zion soil tends to drown during wet periods because of the slowly permeable subsoil. Conservation practices that help to control erosion and add organic matter are needed.

Where this map unit is used for pasture and hay, tall fescue and ladino clover are the main forage plants. No major limitations affect this use.

Forested areas of this map unit are commonly dominated by Virginia pine, shortleaf pine, northern red oak, southern red oak, white oak, and yellow-poplar. Loblolly pine is common in areas where trees are planted. It generally is recommended for planting. The most common understory plants are flowering dogwood, sourwood, blackgum, and American holly. The windthrow hazard is the main management concern.

The depth to bedrock and the high shrink-swell potential are the main limitations affecting building site development. The depth to bedrock, the slow permeability, and a high content of clay in the subsoil of the Zion soil are severe limitations on sites for sanitary facilities. The slow permeability and the slope are moderate limitations affecting recreational development

on the Zion soil. The depth to bedrock is a severe limitation affecting recreational development on the Wilkes soil.

The Zion soil is in capability subclass IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of this soil is 6D. The Wilkes soil is in capability subclass VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of this soil is 7D.

Prime Farmland

In this section, prime farmland is defined and the soils in Stokes County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

The following map units are considered prime farmland in Stokes County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine whether or not limitations have been overcome by corrective measures.

About 54,565 acres, or nearly 19 percent of the county, is prime farmland. Some of the larger areas are in the southwestern, southeastern, and northeastern parts of the county in general soil map units 2, 4, 6, and 8. Smaller areas of prime farmland are scattered throughout the county.

The soils identified as prime farmland in Stokes County are:

CcB	Cecil fine sandy loam, 2 to 8 percent slopes
CeB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded
ChA	Chewacla loam, 0 to 2 percent slopes, occasionally flooded (where drained and protected from flooding or not frequently flooded during the growing season)
DgB	Dogue fine sandy loam, 2 to 8 percent slopes, rarely flooded
MaB2	Masada sandy clay loam, 2 to 8 percent slopes, eroded
MnB	Mayodan fine sandy loam, 2 to 8 percent slopes

MoB2	Mayodan sandy clay loam, 2 to 8 percent slopes, eroded
PcB2	Pacolet sandy clay loam, 2 to 8 percent slopes, eroded
RnB	Rion fine sandy loam, 2 to 8 percent slopes
RtA	Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded
WeB	Wedowee loam, 2 to 8 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help to prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Stokes County that are well suited to crops also are well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for nonfarm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Charles F. Anderson, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units" and in the tables. Specific information can be obtained from the local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service.

More than 34,000 acres was available for use as cropland in Stokes County in 1989. Crops were actually harvested from about 20,000 acres. Tobacco was grown on about 6,000 acres, corn for grain and silage on about 4,000 acres, soybeans on about 3,500 acres, and small grain, mainly wheat and oats, on about 6,000 acres. Much of the small grain was double-cropped with soybeans. A small acreage was used for the commercial production of strawberries, melons, sweet corn, tomatoes, and other vegetables and fruits. About 14,000 acres was fallow land. The rest was used for conservation purposes. About 37,000 acres was used for hay and pasture.

Cropland Management

Erosion is a major management concern on about 95 percent of the cropland in Stokes County. It is also a problem if a large percentage of pasture is not well maintained or is converted to cropland. All of the soils that are used as cropland and have a slope of more than 2 percent are subject to erosion. The loss of the surface layer because of erosion is very costly and damages the environment. Organic matter, pesticides, fertilizers, and lime also are lost. The soil and the accompanying chemicals wash into, clog, and pollute

streams and lakes. Productivity decreases and tilth deteriorates as the surface layer and organic matter are lost.

Generally, cultivation in eroded areas of Pacolet, Cecil, Masada, and Mayodan soils requires more intensive management than on other soils in the county. Because the original friable surface layer has eroded away and the more clayey subsoil is exposed, the preparation of a seedbed is more difficult. Because of the finer textured surface layer, rainfall results in crusting on the surface and hardening when dry. If the soil is tilled during wet periods, hard clods form. The cloddiness makes tillage difficult later on. Because the rate of water infiltration and the available water capacity decrease and the rate of surface runoff increases, the hazard of erosion increases.

Uncontrolled runoff is the primary cause of erosion in the county. The amount of water available for crops commonly limits crop yields, especially during dry periods. The volume and texture of the soil greatly influence the amount of water held in the soil. A well planned resource management system can control the loss of soil and water. Most resource management systems incorporate several conservation measures.

Establishing a suitable surface drainage system, such as grassed waterways and field borders that have a permanent plant cover, is the first component of any resource management system. Most grassed waterways consist of shaping and planting a permanent plant cover on the natural drainageways in the field. Field borders prevent the loss of soil along the edge of the fields and provide areas for equipment to turn. The grassed waterways and field borders generally are seeded to fescue. In the past, terraces and diversions were used to break the length of the slope and to safely direct runoff to a suitable outlet. The use of terraces and diversions on soils that have a uniform slope of less than 8 percent helps to control erosion but does little to increase the rate of water infiltration.

Today, the use of stripcropping is becoming more common. Stripcropping is a method of cultivation in which a crop, such as tobacco, is planted in alternate strips (fig. 9). The other strips are planted to fescue or a close-growing crop, such as small grain. The strips catch runoff and thus control erosion and increase tilth and the rate of water infiltration. The strips and field rows are established on or as near to the contour as possible. Field rows intersect with grassed waterways, so that excess water can safely exit the field.

The use of no-till farming or minimum tillage is another resource management measure that is becoming common. In this method of farming, some plant cover remains on the surface at all times to control erosion and to increase the rate of water infiltration, improve tilth, and reduce the rate of evaporation during the growing season. When a crop is harvested, the next crop is planted into the stubble without tilling the soil or by leaving most of the stubble in place and only slightly tilling the soil. Herbicides are used to control weeds.

All of the soils used as cropland should be tested to determine and maintain fertility levels and to determine the need for lime. Tests should be made every year, no matter what resource management system is used.

Tobacco is the main cash crop in Stokes County (fig. 10). It is grown mainly on the deep, well drained Pacolet, Cecil, Rion, Mayodan, and Wedowee soils on Piedmont uplands, on Hayesville and Sauratown soils on low mountain ridges, and on Riverview, Toccoa, and Masada soils on flood plains and terraces. Some tobacco can grow successfully on the shallow Wilkes soils if the growing season is not too dry. Corn and soybeans are grown mainly on Riverview, Toccoa, Chewacla, Masada, and Dogue soils on flood plains and terraces and on Pacolet, Cecil, and Mayodan soils in the uplands.

Fescue (fig. 11) or a combination of fescue and ladino clover are the primary pasture and hayland plants in the county. Native warm-season grasses make up most of the summer forage. Small acreages of hayland are made up of lespedeza, sudan-sudex, pearl millet, and alfalfa. Some acreages of oats and soybeans also are used as hayland.

Erosion is a hazard on most of the pasture on soils that have a slope of more than 15 percent if the pasture is not well managed. Pasture maintenance on all of the slopes should include annual soil tests to determine the proper fertility levels. Proper stocking rates and rotational grazing should be used to prevent overgrazing. Weeds should be controlled to prevent competition with forages.

Drainage

Drainage is a problem affecting a small acreage of pasture and cropland in Stokes County. Dogue, Hornsboro, and Chewacla soils are moderately well drained or somewhat poorly drained. During wet periods, the root zone may be partly saturated for several days at a time, resulting in damage to plants. A tile drainage system or open ditches can be used if a suitable outlet is available.

Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. The local office of the Natural Resources Conservation Service can provide identification of hydric soils and potential wetlands.

Figure 9.—Stripcropping in an area of Pacolet sandy clay loam, 2 to 8 percent slopes, eroded. This field includes strips of winter wheat and strips prepared for the planting of tobacco in spring.

Rock Fragments

Rock fragments are common on the surface of many of the soils in Stokes County. The hardest fragments are mainly quartz or quartzite gneiss, but other fragments are of gneiss, schist, phyllite, and igneous rocks. On most of the soils, such as Pacolet, Cecil, Masada, and Mayodan soils, rock fragments cause some damage to equipment, but they are mainly a nuisance. On Hayesville, Sauratown, Brevard, and Greenlee soils, the abundance and size of the rock fragments make cultivation difficult and often impossible.

Chemical Weed Control

The use of herbicides for weed control is a common practice on the cropland in Stokes County. It decreases the need for tillage and is an integral part of modern cultivation. Selected soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates of both of these properties were determined for the soils in the county. Table 14 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is shown in the USDA texture column in table 13.

In some areas the organic matter content projected for the different soils is outside the range shown in the table. The content can be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage can increase the content of organic matter in the surface layer. A lower content of organic matter is common where the surface layer has been partly or completely removed by erosion or land smoothing. Current soil tests should be used for organic matter determinations.

Soil Fertility

The soils in Stokes County generally are low in natural fertility. They are naturally acid. Additions of lime and fertilizer should be considered for the production of most kinds of crops.

Liming requirements are a major concern on cropland. The acidity level in the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Lime also neutralizes exchangeable aluminum in the soil and thus counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (from calcitic lime) or calcium and magnesium (from dolomitic lime) to the soil.

A soil test is a guide to what amount and kind of lime should be used. The desired pH levels may differ, depending on the soil properties and the crop to be grown.

Nitrogen fertilizer is required for most crops. It is generally not required, however, for clover, in some rotations of soybeans, or for alfalfa that is established. A reliable soil test is not available for predicting nitrogen requirements. Appropriate rates of nitrogen application are described in the section "Yields per Acre."

Soil tests can indicate the need for phosphorus and potassium fertilizer. They should be considered because phosphorus and potassium tend to build up in the soil.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table

Figure 10.—Tobacco in an area of Pacolet sandy clay loam, 2 to 8 percent slopes, eroded.

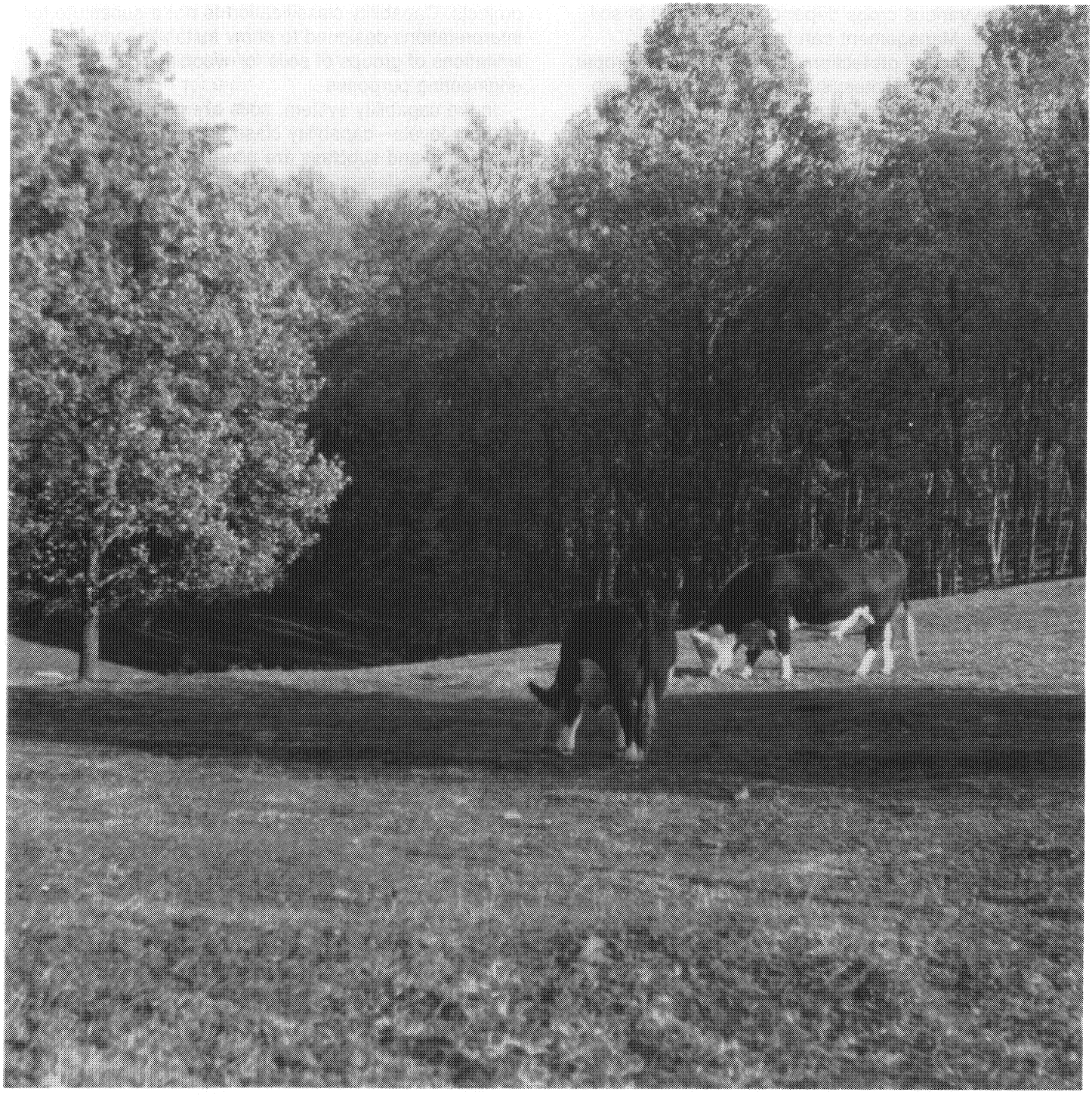

Figure 11.—Fescue pasture in an area of Pacolet sandy clay loam, 8 to 15 percent slopes, eroded.

because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated

yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. The application rate of nitrogen for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. If the yield potential is 100 bushels per acre or less, a rate of 100 to 120 pounds of nitrogen per acre should be used. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by a crop is an unnecessary expense and causes a hazard of water pollution. If corn is grown after the harvest of soybeans, nitrogen rates can be reduced by about 20 to 30 pounds per acre.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the North Carolina Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(13)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c*.

The capability classification of each map unit component is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

Albert Coffey, forester, Natural Resources Conservation Service, helped prepare this section.

Owners of woodland in Stokes County have many objectives. These objectives include producing timber; conserving wildlife, soil, and water; preserving aesthetic values; and providing opportunities for recreational activities, such as commercial hunting. Public demand for clean water and recreational areas creates pressures and opportunities for owners of woodland.

The landowner interested in timber production is faced with the challenge of producing greater yields from smaller areas. Meeting this challenge requires intensive management and silvicultural practices. Many modern silvicultural techniques resemble those long practiced in agriculture. They include establishing, weeding, and thinning a desirable young stand; propagating the more productive species and genetic varieties; providing short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and improving tree growth by applications of fertilizer. Even though timber crops require decades to grow, the goal of intensive management is similar to the goal of intensive agriculture. This goal is to produce the greatest yield of the most valuable crop as quickly as possible.

Forests cover 183,545 acres, or about 63 percent of the land area of Stokes County *(12)*. Commercial forest is land that is producing or is capable of producing crops of industrial wood and that has not been withdrawn from timber production. Shortleaf pine and Virginia pine are the dominant natural pine species that are grown for commercial timber production in the county. Such hardwoods as southern red oak, northern red oak, and white oak are important commercial hardwood species. Loblolly pine is the most important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage (fig. 12).

The four forest types identified in Stokes County are described in the following paragraphs *(8, 12)*:

Loblolly-shortleaf pine. This forest type covers 50,435 acres. It is more than 50 percent loblolly pine or shortleaf pine. Generally, shortleaf pine is the dominant species, but in many areas of the county Virginia pine is more dominant than loblolly pine or shortleaf pine. Shortleaf pine is fairly common in the southern part of the county, and eastern white pine is common in the northern part. The common associated hardwood species include yellow-poplar, white oak, red oak, gum, and hickory. The understory generally consists of hardwood seedlings and saplings, which are more tolerant of shade than pine seedlings and saplings.

Oak-pine. This forest type covers 17,878 acres. It is more than 50 percent hardwoods and 25 to 50 percent pines. The common associated species include northern red oak, scarlet oak, black oak, white oak, hickory, gum, shortleaf pine, Virginia pine, and yellow-poplar. If left undisturbed, this forest type develops into a forest of predominantly oak and other upland hardwoods. The understory generally consists of hardwood seedlings and saplings, which are more tolerant of shade than pine seedlings and saplings. Hardwoods vigorously compete for light and moisture in the shaded understory. As mature stands of pines are harvested, the dense understory of young hardwoods becomes dominant.

Oak-hickory. This forest type covers 111,665 acres. It is more than 50 percent upland oaks, mainly white oak, black oak, northern red oak, and scarlet oak, and hickory. About 15,000 acres in the Sauratown Mountain Range is made up predominantly of chestnut oak. The common associated species include elm, red maple, yellow-poplar, shortleaf pine, and Virginia pine.

Elm-ash-cottonwood. This forest type covers 3,567 acres. It is made up of bottom land species, such as elm and ash. The common associated species include sweetgum, maple, sycamore, willow, beech, and river birch.

One of the first steps in planning intensive woodland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning expenses and profits associated with intensive woodland management, land acquisition, or industrial investments.

The potential productivity of woodland depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Other site factors are also important. The gradient and length of slopes affect water movement and availability. In mountainous areas, elevation and aspect affect the amount of sunlight a site receives and the rate of evaporation. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. The best sites are generally on north- and east-facing slopes in the lower areas, in sheltered coves, and in

Figure 12.—A stand of loblolly pine in an area of Mayodan fine sandy loam, 2 to 8 percent slopes.

gently sloping, concave areas. The amount of rainfall and length of growing season influence site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare per year. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of the slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, the use of wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement

planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, a fragipan, by bedrock, or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds break trees but do not uproot them; *moderate* if strong winds blow a few trees over and break many trees; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. The predominant common trees are listed in table 6 in the order of their observed occurrence. Additional species that commonly occur on the soils may be listed in the detailed soil map unit descriptions. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The estimates of the productivity of the soils in this survey are based mainly on loblolly pine, eastern white pine, southern red oak, yellow-poplar, and chestnut oak *(3, 5, 6, 9)*.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands. Productivity of a site can be improved through management practices, such as bedding, ditching, managing water, applying fertilizer, and planting genetically improved species.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation. If hardwoods are desired on a forest site, acceptable species should naturally reproduce from seeds and sprouts. Special site preparation techniques may be required. The planting of hardwoods on a specific site should be based on the advice of a forester.

Loblolly pine is generally used for planting. Eastern white pine commonly is used for planting on mountain sites. In cutover areas, site preparation generally includes burning or clearing excess vegetation or leftover treetops from the area to be planted. If eastern white pine is planted, chemicals to control competing vegetation should be sprayed 3 to 4 years after the seedlings are planted.

Shortleaf pine also can be replanted for timber production, but it generally is not used because it matures in a slightly longer period of time than loblolly pine or eastern white pine. When stands of shortleaf pine are 15 to 20 years old, controlled burning in winter is a good practice to control undergrowth and reduce the danger of a damaging fire.

Hardwoods generally are not used for replanting because they mature more slowly than the species of pines used for planting. If hardwoods are to be planted, the site should be cleaned as thoroughly as possible without burning or spraying, and sprouts, stumps, and seeds should be regenerated.

Recreation

A variety of recreational activities is available in Stokes County. Hanging Rock State Park, about 4 miles southwest of Danbury, covers 5,862 acres in the Sauratown Mountain Range. The park has campgrounds, picnic areas, nature trails, horseback riding trails, and a lake for swimming and fishing. A local hang gliding club maintains two launch ramps on Sauratown Mountain. Several small county and civic parks have ball fields, tennis courts, picnic areas, and playgrounds. Two golf courses are in the county.

The Dan River, which crosses the county, is used for canoeing, tubing, fishing, and swimming. Belews Lake, in the southeastern corner of the county, provides opportunities for boating, water skiing, and fishing. Numerous watershed lakes, streams, and ponds in the county are used for fishing. A variety of small game animals and deer are in scattered areas throughout the county.

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil

features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John P. Edwards, biologist, Natural Resources Conservation Service, helped prepare this section.

Stokes County has a variety of game and nongame animals. Good habitat for edge dwelling species, such as rabbit and quail, is along field borders separating the wooded areas from cropland and pasture. Good habitat for woodland species, such as squirrel and raccoon, is in the hardwoods and the mixed hardwoods and pine that make up about 63 percent of the county.

Deer feed on woodland shrubs, shoots, and acorns and on field crops throughout the county. The habitat for ducks and geese along the many small streams, ponds, and lakes is fair. Many species of songbirds and doves inhabit the fields and wooded areas. Small populations of ruffed grouse and wild turkey and several species of predatory birds, such as hawks and owls, inhabit the county. Turkey vultures roost in trees and on rock ledges on mountain ridges throughout the county. Other species that inhabit the county include red fox, gray fox, opossum, skunk, groundhog, beaver, muskrat, mink, bobcat, and weasel.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and

other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The ratings given in table 8 are intended to be used as a guide and are not site specific. Onsite investigation is needed for individual management plans.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and pokeberry.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwoods and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, and sedges.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and white-tailed deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the

most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, the shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. The depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year.

They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. The depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), the shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the office of the Stokes Soil and Water Conservation District or the local office of the North Carolina Cooperative Extension Service.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfill. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, soil reaction, and content of sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and the shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* have more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. These soils have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification

are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale, siltstone, and weathered granite saprolite, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area. Ponds that are less than about 2 acres in size are not shown on the soil maps because of the scale of mapping.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, or sodium. The depth to a high water table affects the amount of usable material. It also affects trafficability.

Soil material that has a high content of sodium also is poorly suited to use in the construction of embankments because it is characterized by a high rate of dispersion. Mayodan and Pinkston soils are examples of soils that have a high content of sodium.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, and the potential for

frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the availability of suitable irrigation water, the depth of the root zone, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to help to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. Maintenance of terraces and diversions is adversely affected by a restricted rooting depth, a severe hazard of soil blowing or water erosion, and restricted permeability.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed *(11)*. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages, by weight, of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, by volume, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a

percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated content of clay in each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time. It is the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

The shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six

factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep or very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the surface by flowing water is caused by overflowing streams and by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15. An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after

adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical and Chemical Analyses and Clay Mineralogy of Selected Soils

The results of physical analysis of selected typical pedons in the survey area are given in table 16 and the results of chemical analysis in table 17. The determinations of clay mineralogy are given in table 18. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Survey Laboratory Staff, Lincoln, Nebraska.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(11)*.

Total sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Total silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Total clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3B1).
Reaction (pH)—1:1 water dilution (8C1f).
Reaction (pH)—potassium chloride (8C1g).
Extractable cations—ammonium acetate pH 7.0, atomic absorption; calcium (6N2e), magnesium (6O2d), sodium (6P2b), and potassium (6Q2b).
Cation-exchange capacity—ammonium acetate, pH 7.0, steam distillation (5A8b).
Cation-exchange capacity—sum of cations (5A3a).
Extractable acidity—barium chloride-triethanolamine IV (6H5a).
Aluminum—potassium chloride extraction (6G9).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Organic carbon—wet combustion. Walkley-Black modified acid-dichromate, ferrous sulfate titration (6A1c).
Clay mineralogy—x-ray defraction (7A2i).

Engineering Index Test Data

Table 19 shows laboratory test data for selected pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Soil Mechanics Laboratory, Fort Worth, Texas, and by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit, Raleigh, North Carolina.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(14)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Kanhapludults (*Kanhapl*, meaning low activity clay plus minimal horizonation, plus *udult*, the suborder of the Ultisols that has an udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Kanhapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, kaolinitic, thermic Typic Kanhapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The location of the typical pedon is described, and coordinates generally are identified by the State plane grid system. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(15)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(14)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Ashe Series

The Ashe series consists of somewhat excessively drained, moderately rapidly permeable soils on mountain ridges and on side slopes. These soils formed

in residuum of quartzite gneiss. Slopes range from 10 to 80 percent.

Typical pedon of Ashe channery fine sandy loam, in an area of Rock outcrop-Ashe complex, 10 to 80 percent slopes, extremely bouldery; about 6.5 miles north of King on Sauratown Mountain, 3.2 miles west on Secondary Road 1172 from its intersection with Secondary Road 1188, about 1,500 feet southwest of the end of Secondary Road 1172, in a wooded area (State plane coordinates 957,600 feet N., 1,594,600 feet E.):

Oi—1 inch to 0; partly decomposed leaf litter.
A1—0 to 3 inches; dark brown (10YR 3/3) channery fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; few fine flakes of mica; about 15 percent channers, 10 percent flagstones, and 8 percent boulders and stones; very strongly acid; abrupt smooth boundary.
A2—3 to 9 inches; dark yellowish brown (10YR 4/4) channery fine sandy loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; few fine pores; few fine flakes of mica; about 15 percent channers, 10 percent flagstones, and 5 percent stones and boulders; very strongly acid; gradual smooth boundary.
Bw—9 to 27 inches; dark yellowish brown (10YR 4/6) channery fine sandy loam; weak medium subangular blocky structure; very friable; few fine, medium, and coarse roots; few fine pores; few fine flakes of mica; about 15 percent channers, 10 percent flagstones, and 5 percent stones and boulders; very strongly acid; clear wavy boundary.
C—27 to 33 inches; brownish yellow (10YR 6/6) very flaggy fine sandy loam; massive; very friable; few fine and medium roots; common fine flakes of mica; about 20 percent flagstones, 15 percent channers, and 5 percent stones and boulders; very strongly acid; abrupt wavy boundary.
R—33 inches; hard quartzite gneiss.

The solum is 20 to 40 inches thick. The depth to bedrock is 20 to 40 inches. The content of rock fragments ranges from 5 to 40 percent in the A and C horizons and from 5 to 35 percent in the B horizon. Rock fragments are dominantly channers, flagstones, and stones and boulders. Reaction is very strongly acid to moderately acid in all horizons unless the surface layer has been limed. All horizons have few or common flakes of mica.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 to 4. Where value is 3, the horizon is less than 7 inches thick.

The BE horizon, if it occurs, has hue of 10YR and value and chroma of 4 to 6. It is fine sandy loam or loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam or loam in the fine-earth fraction.

The BC horizon, if it occurs, has colors and textures similar to those of the Bw horizon.

The C horizon is similar in color to the B horizon. It is saprolite and is fine sandy loam, loam, loamy fine sand, or loamy sand in the fine-earth fraction.

The Cr horizon, if it occurs, is partly weathered quartzite gneiss in shades of gray, white, pink, or brown.

Brevard Series

The Brevard series consists of well drained, moderately permeable soils on foot slopes, in coves, and on benches and fans in the Sauratown Mountain Range. These soils formed in colluvium weathered from felsic metamorphic rock, such as quartzite gneiss and schistose quartzite. Slopes range from 8 to 60 percent.

Typical pedon of Brevard very flaggy fine sandy loam, in an area of Brevard-Greenlee complex, 25 to 60 percent slopes, extremely bouldery; about 5 miles southwest of Danbury; 0.4 mile east on Secondary Road 2028 from its intersection with Secondary Road 2011, about 1.0 mile southeast on an unpaved private road, 100 feet southeast of the road, in a hardwood forest (State plane coordinates 964,200 feet N., 1,620,000 feet E.):

Oi—1 inch to 0; partly decomposed organic matter, leaves, and root mat.
A—0 to 3 inches; dark grayish brown (10YR 4/2) very flaggy fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; common fine pores; few fine flakes of mica; about 20 percent flagstones, 15 percent channers, and 7 percent stones and boulders; very strongly acid; clear smooth boundary.
E—3 to 13 inches; light yellowish brown (10YR 6/4) very flaggy fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; common fine pores; few fine flakes of mica; about 25 percent flagstones, 10 percent channers, and 7 percent stones and boulders; strongly acid; gradual wavy boundary.
BE—13 to 16 inches; reddish yellow (7.5YR 6/6) flaggy fine sandy loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; few fine pores; few fine flakes of mica; about 10 percent flagstones, 5 percent

channers, and 5 percent stones; strongly acid; gradual wavy boundary.

Bt1—16 to 26 inches; yellowish red (5YR 5/8) flaggy sandy clay loam; common medium prominent reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine pores; few faint clay films on faces of peds; few fine flakes of mica; about 10 percent flagstones, 5 percent channers, and 5 percent stones; strongly acid; gradual wavy boundary.

Bt2—26 to 33 inches; red (2.5YR 5/8) flaggy sandy clay loam; few medium distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine pores; few faint clay films on faces of peds; few fine flakes of mica; about 10 percent flagstones, 5 percent channers, and 5 percent stones; moderately acid; gradual wavy boundary.

Bt3—33 to 51 inches; red (2.5YR 5/8) flaggy sandy clay loam; many coarse prominent brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine flakes of mica; about 15 percent flagstones, 5 percent channers, and 10 percent stones; moderately acid; gradual wavy boundary.

BC—51 to 65 inches; light red (2.5YR 6/8) flaggy fine sandy loam; many coarse prominent brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; very friable; few fine roots; few fine flakes of mica; about 15 percent flagstones, 5 percent channers, and 10 percent stones; moderately acid.

The solum is 43 to more than 60 inches thick. The depth to bedrock is more than 60 inches. Reaction is very strongly acid to moderately acid in all horizons unless the surface layer has been limed. The content of rock fragments ranges from 0 to 50 percent in the A and E horizons, from 0 to 35 percent in the B horizon, and from 15 to 60 percent in the C horizon. The fragments range in size from channers to boulders. All horizons have few or common flakes of mica.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 2 to 4. Where value and chroma are 3 or less, the horizon is less than 6 inches thick.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. It is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The BE horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The Bt horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, or loam in the fine-earth fraction.

The BC horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, if it occurs, typically is loamy colluvial material that varies in color. Some pedons are underlain by a thin 2C horizon of loamy saprolite that weathered from quartzite gneiss.

Cecil Series

The Cecil series consists of well drained, moderately permeable soils on uplands. These soils formed in material weathered from felsic metamorphic and igneous rock (fig. 13), such as quartz-mica gneiss and granite. Slopes range from 2 to 15 percent.

Typical pedon of Cecil sandy clay loam, 2 to 8 percent slopes, eroded; about 2.0 miles northwest of Sandy Ridge; 0.2 mile north on Secondary Road 1612 from its intersection with North Carolina Highway 704, about 0.4 mile east on a farm road, 200 feet south of the road, in a cultivated field (State plane coordinates 1,014,700 feet N., 1,658,000 feet E.):

Ap—0 to 8 inches; yellowish red (5YR 4/6) sandy clay loam; common fine distinct red (2.5YR 4/6) mottles; weak medium granular structure; friable; common fine roots; common fine pores; about 10 percent fine quartz gravel; about 3 percent cobbles; few fine flakes of mica; strongly acid; abrupt wavy boundary.

Bt1—8 to 16 inches; red (2.5YR 4/8) clay; common medium prominent yellowish red (5YR 4/6) mottles of surface material in old root channels; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; common fine roots; few fine pores; many distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—16 to 32 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—32 to 41 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—41 to 55 inches; red (2.5YR 4/8) clay loam; common medium prominent red (10R 5/6) and few medium prominent strong brown (7.5YR 5/8) and reddish yellow (7.5YR 7/8) mottles; weak coarse

subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—55 to 60 inches; red (10R 5/6) loam that weathered from saprolite; few medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; common fine flakes of mica; strongly acid.

The solum is 40 to 60 inches thick. The depth to bedrock is more than 60 inches. All horizons have few or common flakes of mica. Reaction is very strongly acid to slightly acid in the A horizon and very strongly acid or strongly acid in the B and C horizons unless the surface layer has been limed.

The Ap or A horizon has hue of 2.5YR to 10YR, value of 3 to 5, and chroma of 2 to 8. Where value is 3 or less, the horizon is less than 6 inches thick. The texture is fine sandy loam or sandy clay loam.

The E horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam, sandy loam, or loam.

The BA or BE horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is sandy clay loam, loam, or clay loam.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Mottles that have hue of 5YR to 10YR are few or common. Hue can range to 5YR in pedons where the soil is not mottled. The texture is clay loam or clay.

The BC horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. Mottles are similar to those in the Bt horizon. The BC horizon is sandy clay loam or clay loam.

The C horizon has hue of 10R to 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles are in shades of yellow or brown. The texture varies but commonly is loam, sandy loam, clay loam, or sandy clay loam.

Chewacla Series

The Chewacla series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in recent alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Chewacla loam, 0 to 2 percent slopes, occasionally flooded; about 3.5 miles north of Lawsonville; 0.2 mile east on Secondary Road 1601 from its intersection with North Carolina Highway 8, about 1,500 feet east-southeast of where Secondary Road 1601 turns north, 100 feet north of Snow Creek, in a pasture (State plane coordinates 1,009,500 feet N., 1,640,600 feet E.):

A1—0 to 3 inches; dark grayish brown (10YR 4/2) loam; weak coarse granular structure; friable; many fine roots; few fine flakes of mica; slightly acid; clear smooth boundary.

A2—3 to 9 inches; brown (10YR 5/3) loam; common fine distinct yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; friable; many fine roots; common fine pores; few worm and crawfish casts; few fine flakes of mica; moderately acid; clear wavy boundary.

Bw1—9 to 17 inches; brown (10YR 5/3) sandy clay loam; common fine prominent yellowish red (5YR 4/6) and common fine faint grayish brown mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; common worm and crawfish casts; common fine flakes of mica; moderately acid; gradual wavy boundary.

Bw2—17 to 30 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium prominent yellowish red (5YR 4/6) and common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; few fine roots; common worm and crawfish casts; few fine flakes of mica; moderately acid; gradual wavy boundary.

Bg—30 to 40 inches; gray (10YR 6/1) sandy clay loam; many coarse prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable; few fine flakes of mica; slightly acid; clear smooth boundary.

Cg1—40 to 48 inches; gray (10YR 5/1) sandy loam; few fine prominent reddish yellow (7.5YR 6/6) mottles; massive; friable; common fine flakes of mica; moderately acid; gradual wavy boundary.

Cg2—48 to 60 inches; gray (10YR 5/1) gravelly coarse sand; single grain; loose; moderately acid.

The solum is 15 to 70 inches deep over stratified sediments. The depth to bedrock is more than 60 inches. All horizons have few to many flakes of mica throughout. Unless the surface layer has been limed, reaction is very strongly acid to slightly acid to a depth of 40 inches. Below this depth, it ranges from very strongly acid to mildly alkaline.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. It is less than 7 inches thick where value is less than 4.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. Mottles that have chroma of 2 or less are within 24 inches of the surface. The Bg horizon, if it occurs, has a gray matrix. The B horizon is sandy clay loam, clay loam, or loam. Individual subhorizons may have appreciable amounts of silt.

The Cg horizon is similar in color to the Bg horizon and consists of stratified alluvium that varies in texture.

Cowee Series

The Cowee series consists of well drained, moderately permeable soils on mountain ridges and on side slopes. These soils formed in material weathered from felsic metamorphic rock, in the form of schist and phyllite. Slopes range from 8 to 60 percent.

Typical pedon of Cowee gravelly loam, 8 to 25 percent slopes, stony; about 6 miles northwest of Francisco; 0.5 mile north on Secondary Road 1794 from its intersection with Secondary Road 1795 in Surry County, 15 feet east of the roadbank (State plane coordinates 1,017,400 feet N., 1,576,600 feet E.):

A—0 to 2 inches; dark grayish brown (10YR 4/2) gravelly loam; moderate medium granular structure; very friable; many fine and common medium and coarse roots; few fine flakes of mica; about 20 percent gravel, 5 percent cobbles, and few stones; extremely acid; clear smooth boundary.

E—2 to 7 inches; yellowish brown (10YR 5/4) gravelly loam; weak medium granular structure; very friable; many fine, medium, and coarse roots; few fine pores; few fine flakes of mica; about 20 percent gravel; very strongly acid; gradual wavy boundary.

BE—7 to 14 inches; brown (7.5YR 5/4) gravelly loam; weak fine subangular blocky structure; friable; many fine, medium, and coarse roots; common fine pores; few fine flakes of mica; about 20 percent gravel; very strongly acid; gradual wavy boundary.

Bt1—14 to 27 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable, sticky and slightly plastic; common fine, medium, and coarse roots; common fine pores; few faint clay films on vertical faces of peds; few fine flakes of mica; about 20 percent gravel; moderately acid; gradual wavy boundary.

Bt2—27 to 31 inches; yellowish red (5YR 5/6) gravelly clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine pores; few faint clay films on faces of peds; few fine flakes of mica; about 20 percent cobbles; moderately acid; abrupt irregular boundary.

Cr—31 to 60 inches; multicolored, partly weathered schist; can be dug with difficulty by a spade.

The solum is 20 to 39 inches thick. The depth to partly weathered bedrock is 20 to 40 inches, and the depth to hard bedrock is more than 40 inches. The content of rock fragments ranges from 0 to 35 percent in all horizons. The fragments are dominantly gravel in size but range to stone. Reaction is extremely acid to moderately acid unless the surface layer has been limed.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. Where value is 3, the horizon is less than 6 inches thick.

The E horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. It is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The BE horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy loam, or fine sandy loam in the fine-earth fraction.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam, sandy clay loam, loam, sandy loam, or fine sandy loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam, sandy loam, loam, or sandy clay loam in the fine-earth fraction.

The C horizon, if it occurs, is similar in color to the BC horizon or is multicolored. It is saprolite that has a texture of fine sandy loam, sandy loam, or loam in the fine-earth fraction.

Dogue Series

The Dogue series consists of moderately well drained, moderately slowly permeable soils on high stream terraces. These soils formed in old alluvium. Slopes range from 2 to 15 percent.

Typical pedon of Dogue fine sandy loam, 2 to 8 percent slopes, rarely flooded; about 3.0 miles west of Walnut Cove; 0.4 mile north on Secondary Road 2022 from its intersection with Secondary Road 1941, about 800 feet west of the road, in a cutover area of woodland (State plane coordinates 927,400 feet N., 1,648,000 feet E.):

A—0 to 3 inches; dark brown (10YR 4/3) fine sandy loam; weak coarse granular structure; friable; common fine and few medium roots; few fine pores; very strongly acid; abrupt smooth boundary.

E—3 to 9 inches; light yellowish brown (10YR 6/4) loam; common medium faint yellowish brown (10YR 5/4) mottles; weak fine angular blocky structure; friable; few fine and coarse roots; few fine pores; very strongly acid; clear smooth boundary.

Bt1—9 to 18 inches; brownish yellow (10YR 6/6) clay loam; moderate medium angular blocky structure; firm, sticky and plastic; few medium roots; few medium pores; few faint clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

Bt2—18 to 25 inches; brownish yellow (10YR 6/6) clay loam; common medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; few medium roots; few medium pores; few faint clay

films on vertical faces of peds; few fine flakes of mica; about 1 percent quartz gravel; very strongly acid; gradual wavy boundary.

Bt3—25 to 33 inches; light yellowish brown (2.5Y 6/4) clay; common medium prominent reddish yellow (7.5YR 6/8), few medium prominent red (2.5YR 4/8), and common medium distinct light gray (10YR 7/2) mottles; strong coarse columnar structure parting to strong medium angular blocky; firm, sticky and plastic; few fine and medium roots; few medium pores; many faint clay films on faces of peds; few fine flakes of mica; about 2 percent quartz gravel; very strongly acid; gradual wavy boundary.

Btg—33 to 48 inches; light gray (10YR 7/1) sandy clay loam; common medium prominent brownish yellow (10YR 6/6) and common coarse prominent red (10R 5/8) mottles; strong coarse columnar structure parting to strong coarse angular blocky; firm, sticky and plastic; few fine roots; few medium pores; many faint clay films on faces of peds; few fine flakes of mica; about 5 percent quartz gravel; very strongly acid; gradual wavy boundary.

BCg—48 to 60 inches; light gray (10YR 7/1) sandy clay loam; many coarse prominent red (2.5YR 4/8) and common medium prominent yellowish brown (10YR 5/8) mottles; moderate coarse angular blocky structure; firm, sticky and plastic; few fine roots; few faint clay films on faces of peds; few fine flakes of mica; about 10 percent quartz gravel; very strongly acid.

The solum is 40 to more than 60 inches thick. The depth to bedrock is more than 60 inches. Few or common flakes of mica are in the B and C horizons. Reaction is extremely acid to strongly acid in all horizons unless the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is fine sandy loam, sandy loam, or loam.

The BE or BA horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8. It is loam, clay loam, or sandy clay loam.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 8. In some pedons it has high- and low-chroma mottles, and in others it is mottled and does not have a dominant matrix color. The Bt horizon is clay, clay loam, sandy clay, or sandy clay loam.

The BC horizon has colors similar to those of the lower part of the Bt horizon. It is clay loam, sandy clay loam, sandy loam, or sandy clay.

The C horizon, if it occurs, has colors and mottles similar to those of the lower part of the B horizon. It commonly is stratified and is sand to sandy clay loam.

Greenlee Series

The Greenlee series consists of well drained, moderately rapidly permeable soils on foot slopes, in coves, and on benches and fans in the Sauratown Mountain Range. These soils formed in colluvium and local alluvium weathered from felsic metamorphic rock, such as quartzite gneiss and schistose quartzite. Slopes range from 8 to 60 percent.

Typical pedon of Greenlee very flaggy loam, in an area of Brevard-Greenlee complex, 25 to 60 percent slopes, extremely bouldery; about 6 miles southwest of Danbury; 1.1 miles north on Secondary Road 2009 from its intersection with Secondary Road 2019, about 0.3 mile northeast on a private road, 0.1 mile north on the left fork of the road, 500 feet west of the road, in a hardwood forest (State plane coordinates 967,000 feet N., 1,619,700 feet E.):

Oi—2 inches to 0; partly decomposed leaf litter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) very flaggy loam; moderate fine granular structure; very friable; many fine, medium, and coarse roots; few fine flakes of mica; about 30 percent flagstones, 10 percent channers, and 15 percent stones and boulders; very strongly acid; clear wavy boundary.

AB—2 to 8 inches; yellowish brown (10YR 5/4) very flaggy loam; weak medium granular structure; very friable; many fine, medium, and coarse roots; few fine flakes of mica; about 30 percent flagstones, 10 percent channers, and 10 percent stones and boulders; very strongly acid; clear wavy boundary.

Bw1—8 to 31 inches; brownish yellow (10YR 6/6) very flaggy loam; few pockets of sandy clay loam; weak medium subangular blocky structure; friable; common medium and few fine and coarse roots; few fine pores; few fine flakes of mica; about 30 percent flagstones, 10 percent channers, and 10 percent stones and boulders; very strongly acid; gradual wavy boundary.

Bw2—31 to 40 inches; brownish yellow (10YR 6/6) very flaggy loam; few pockets of sandy clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine, medium, and coarse roots; few fine pores; few fine flakes of mica; about 25 percent flagstones, 10 percent channers, and 20 percent stones and boulders; very strongly acid; gradual wavy boundary.

Bw3—40 to 53 inches; light yellowish brown (10YR 6/4) very flaggy loam; few pockets of sandy clay loam;

many medium prominent strong brown (7.5YR 5/8) mottles and common medium distinct very pale brown (10YR 7/3) mottles in old root channels; friable; few fine roots; few fine pores; few fine flakes of mica; about 25 percent flagstones, 10 percent channers, and 20 percent stones and boulders; very strongly acid; gradual wavy boundary.

Bw4—53 to 62 inches; light yellowish brown (10YR 6/4) very flaggy loam; few pockets of sandy clay loam; common medium prominent red (2.5YR 4/8) and few medium prominent strong brown (7.5YR 5/8) and very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; friable; few fine, medium, and coarse roots; few fine pores; few fine flakes of mica; about 25 percent flagstones, 10 percent channers, and 20 percent stones and boulders; very strongly acid.

The solum is 20 to more than 60 inches thick. The depth to bedrock is more than 60 inches. Reaction is extremely acid to moderately acid throughout the profile unless the surface layer has been limed. The content of rock fragments ranges from 35 to 60 percent in the A and B horizons and from 35 to 80 percent in the C horizon. The fragments range in size from channers to boulders.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 2 to 4. Where value and chroma are 3 or less, the horizon is less than 7 inches thick.

The AB or BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam, sandy loam, or loamy sand in the fine-earth fraction.

Hayesville Series

The Hayesville series consists of well drained, moderately permeable soils on side slopes in the Sauratown Mountain Range and on other low mountain ridges and on side slopes. These soils formed in residuum of felsic metamorphic rock, in the form of gneiss and schist. Slopes range from 2 to 60 percent.

Typical pedon of Hayesville channery fine sandy loam, 25 to 60 percent slopes, very stony; about 0.8 mile southwest of Danbury; 0.8 mile south on Sheep Rock Road from its intersection with North Carolina Highway 89 and continuing on a woods road, 750 feet southwest on a trail from where the woods road switches back west on the ridge, 50 feet north of the trail, in a hardwood forest (State plane coordinates 967,000 feet N., 1,648,000 feet E.):

A—0 to 3 inches; brown (10YR 4/3) channery fine sandy loam; weak fine granular structure; very friable; many fine and common coarse roots; about 15 percent channers, 5 percent flagstones, and 3 percent stones; strongly acid; clear smooth boundary.

E—3 to 8 inches; strong brown (7.5YR 5/6) channery fine sandy loam; weak fine granular structure; very friable; common fine and coarse roots; about 15 percent channers; strongly acid; clear smooth boundary.

BE—8 to 12 inches; yellowish red (5YR 5/8) sandy clay loam; common medium distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; few medium and coarse roots; few fine pores; common distinct clay films on faces of peds; about 5 percent channers; strongly acid; gradual wavy boundary.

Bt1—12 to 23 inches; red (2.5YR 4/8) clay; common medium distinct red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common fine pores; common distinct clay films on faces of peds; few fine flakes of mica; about 5 percent channers; strongly acid; gradual wavy boundary.

Bt2—23 to 41 inches; red (2.5YR 4/8) clay; few medium distinct red (2.5YR 5/6) mottles; moderate coarse platy structure parting to moderate medium angular blocky; firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine pores; few faint clay films on faces of peds; few fine flakes of mica; about 5 percent channers; strongly acid; gradual wavy boundary.

BC—41 to 53 inches; red (2.5YR 5/8) clay loam; moderate medium prominent brownish yellow (10YR 6/6) mottles; weak coarse platy structure parting to weak medium angular blocky; friable; few fine roots; common fine flakes of mica; about 5 percent channers; strongly acid; gradual wavy boundary.

C—53 to 65 inches; red (2.5YR 5/6) loam that weathered from saprolite; few tongues of clay along relic rock fractures; moderate medium distinct reddish yellow (5YR 6/8) mottles; massive; friable; common fine flakes of mica; about 5 percent channers; strongly acid.

The solum is 30 to 60 inches thick. The depth to bedrock is more than 60 inches. Few or common flakes of mica are in the Bt, BC, and C horizons. The content of rock fragments ranges from 5 to 35 percent in the A and E horizons and from 0 to 15 percent in the B and C

horizons. The fragments range in size from channers to stones. Unless the surface layer has been limed, reaction is extremely acid to slightly acid in the A horizon. It is extremely acid to moderately acid in the B and C horizons.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 8. Where value is 3 or less, the horizon is less than 7 inches thick.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam or loam in the fine-earth fraction.

The BE horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, loam, or clay loam.

The Bt horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. It is clay loam or clay.

The BC horizon has hue of 10R to 7.5YR, value of 4 to 6, and chroma of 6 to 8. It is loam, sandy clay loam, or clay loam. Mottles in shades of red, yellow, or brown are in the lower part of the B horizon.

The C horizon has colors in shades of red, brown, yellow, or white. It is fine sandy loam, loam, or sandy clay loam.

Hornsboro Series

The Hornsboro series consists of somewhat poorly drained, slowly permeable soils on low stream terraces. These soils formed in old alluvium. Slopes range from 0 to 3 percent.

Typical pedon of Hornsboro loam, 0 to 3 percent slopes, rarely flooded; about 3.0 miles west of Walnut Cove; 0.4 mile west of the intersection of Secondary Road 1941 and Secondary Road 2022, about 300 feet north of Secondary Road 1941, in a grassy area of woodland (State plane coordinates 925,060 feet N., 1,647,500 feet E.):

A—0 to 3 inches; dark grayish brown (10YR 4/2) loam; common fine distinct strong brown (7.5YR 4/6) and medium pale brown (10YR 6/3) mottles; weak coarse granular structure; friable; many fine roots; few fine pores; very strongly acid; clear wavy boundary.

E—3 to 8 inches; brown (10YR 5/3) loam; few medium distinct yellowish brown (10YR 5/8) and very pale brown (10YR 7/3) mottles; weak medium granular structure; friable; many fine and medium roots; many fine pores; very strongly acid; clear wavy boundary.

BE—8 to 15 inches; pale brown (10YR 6/3) loam; many medium faint light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; many medium and few coarse roots; many fine pores; few faint clay films on faces of peds; few quartz pebbles; very strongly acid; clear smooth boundary.

Btg1—15 to 24 inches; light brownish gray (10YR 6/2) clay; common medium distinct reddish yellow (7.5YR 6/8) and few fine prominent red (2.5YR 5/8) mottles; weak medium prismatic structure parting to strong coarse angular blocky; firm; few medium and coarse roots; many fine pores; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

Btg2—24 to 33 inches; gray (10YR 5/1) clay; many coarse distinct brownish yellow (10YR 6/8) mottles; weak medium prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; many fine pores; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt1—33 to 53 inches; brownish yellow (10YR 6/6) clay loam; many medium distinct light brownish gray (10YR 6/2) and few coarse prominent gray (10YR 6/1) mottles; weak medium prismatic structure parting to moderate coarse angular blocky; firm; few fine roots; few fine pores; few intersecting slickensides; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—53 to 77 inches; light yellowish brown (2.5Y 6/4) clay loam; few coarse prominent grayish green (5G 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak coarse angular blocky; firm; few fine roots; few fine pores; common intersecting slickensides 6 to 8 inches across; few fine flakes of mica; few feldspar and quartz pebbles; slightly acid.

The solum is 40 to more than 60 inches thick. The depth to bedrock is more than 60 inches. Flakes of mica range from none to common in the A horizon and are few or common in the B and C horizons. Reaction is very strongly acid to neutral in the surface layer, very strongly acid to mildly alkaline in the Bt and Btg horizons, and slightly acid to moderately alkaline throughout the rest of the profile. A few calcium carbonate concretions are in the lower part of the B horizon and in the C horizon in some pedons.

The A or Ap horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 to 5 and chroma of 0 to 4. Where value is 3 or less, the horizon is less than 7 inches thick.

The E horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 or 4. Some pedons have an Eg horizon that has hue of 10YR to 5Y, value of 5 to 7,

Figure 13.—A very deep, red, clayey soil in the Cecil series. Cecil soils formed in material weathered from felsic metamorphic and igneous rock. Depth is marked in feet.

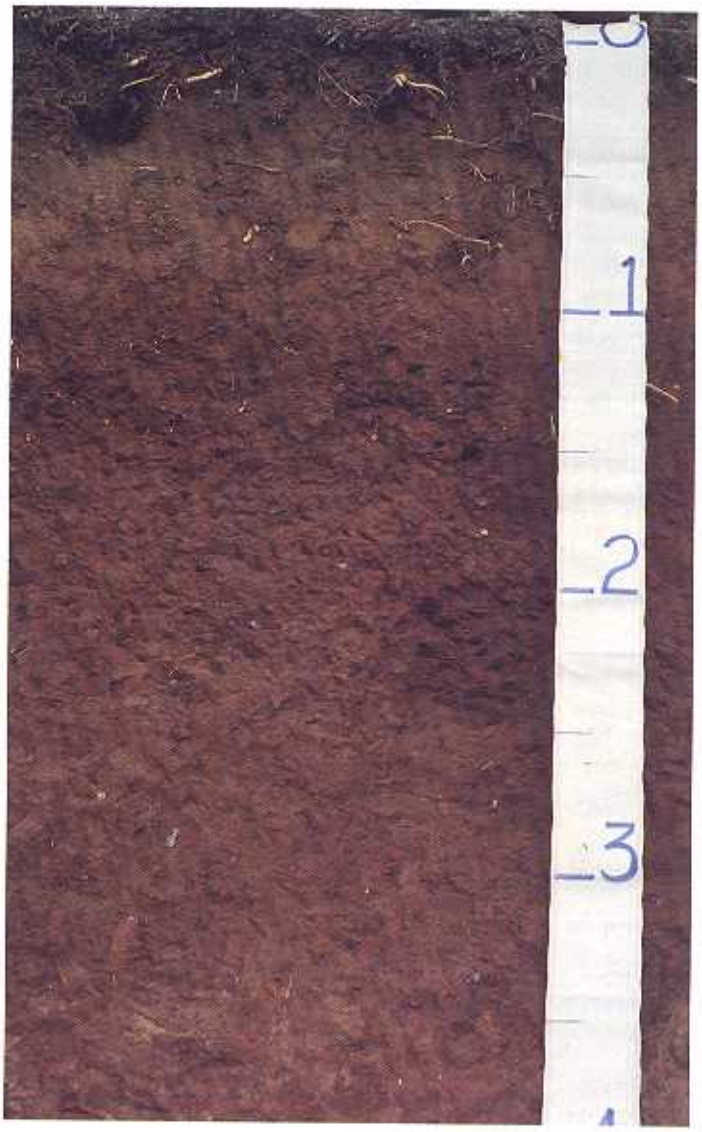

Figure 14.—A very deep, reddish brown, clayey soil in the Mayodan series. Mayodan soils formed in material weathered from mudstone and siltstone. Depth is marked in feet.

Figure 15.—A very deep, red, clayey soil in the Pacolet series. Pacolet soils formed in material weathered from felsic metamorphic and igneous rock. Depth is marked in feet.

Figure 16.—A moderately deep, brown, loamy soil in the Sauratown series. Sauratown soils formed in material weathered from quartzite gneiss. Depth is marked in feet.

Figure 17.—A very deep, brown, clayey soil in the Wedowee series. Wedowee soils formed in material weathered from felsic rock. Depth is marked in feet.

Figure 18.—A brown, loamy soil in the Wilkes series. Wilkes soils formed in material weathered from intermediate and mafic metamorphic and igneous rock.

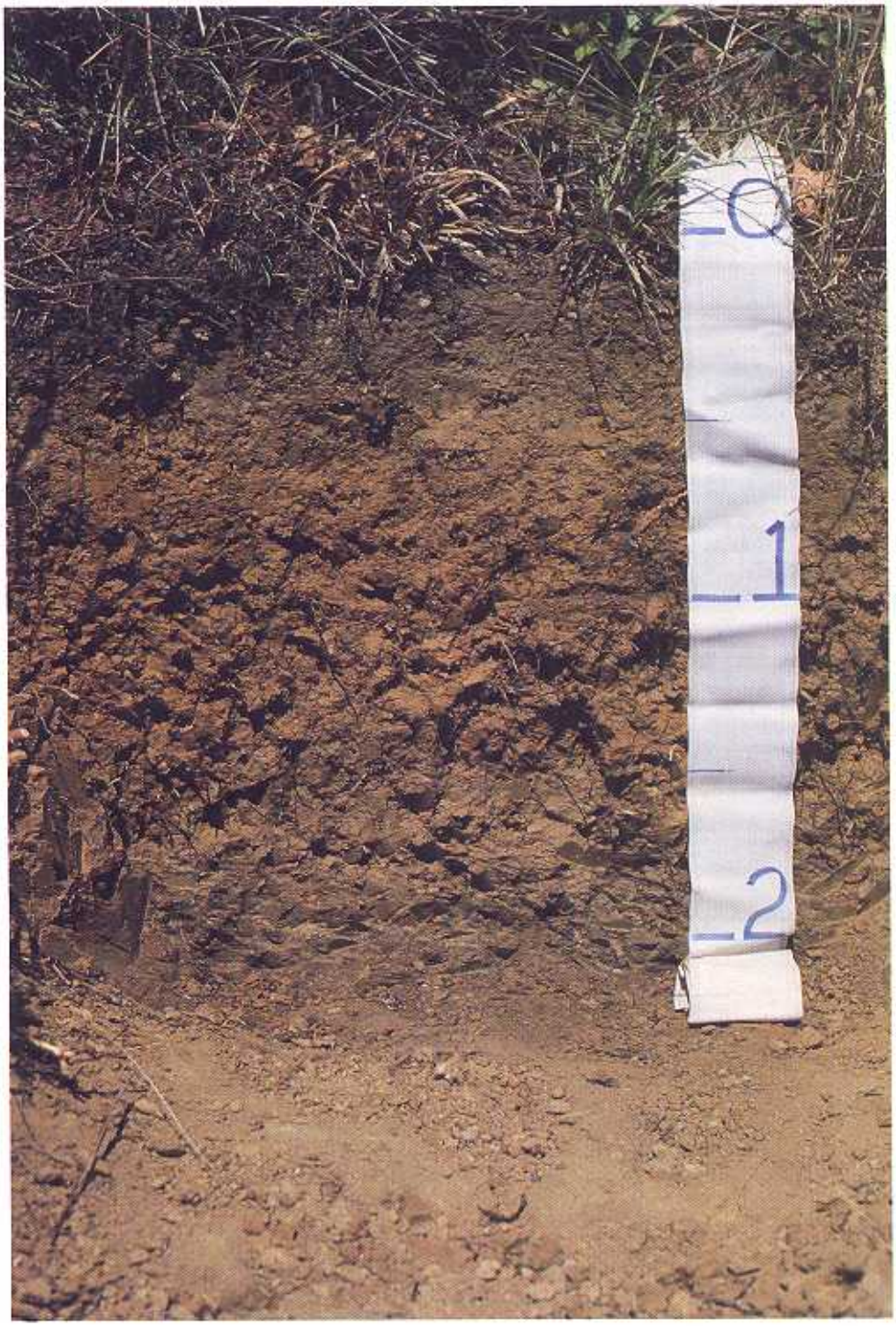

Figure 19.—A moderately deep, brown and yellow, clayey soil in the Zion series. Zion soils formed in material weathered from intermediate and mafic metamorphic and igneous rock. Depth is marked in feet.

and chroma of 2. The E or Eg horizon is fine sandy loam, sandy loam, or loam.

The BE horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 3 or is neutral in hue and has value of 4 to 7. Mottles are in shades of red, yellow, gray, or brown. The texture is sandy clay loam, silty clay loam, loam, or silt loam.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. Mottles are in shades of red, yellow, or brown. The texture is clay, clay loam, sandy clay, silty clay loam, or silty clay.

The Bt horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 to 8. Mottles are in shades of gray, brown, yellow, green, or red. The texture is clay, clay loam, sandy clay, silty clay loam, or silty clay. In some pedons, the B′tg or B′t horizon has the same colors and textures as the Btg and Bt horizons, respectively.

The BC or 2BC horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 3 to 6. Mottles are in shades of gray, yellow, brown, or red. The texture is sandy clay, silty clay loam, loam, clay loam, sandy clay loam, or fine sandy loam.

The BCg or 2BCg horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. Mottles are in shades of yellow, brown, or red. The texture is sandy clay, silty clay loam, loam, clay loam, sandy clay loam, or fine sandy loam.

The Cg or 2Cg horizon, if it occurs, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. Some pedons have a C or 2C horizon that has hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 to 8 and mottles in shades of gray, yellow, brown, or red. The texture varies.

Masada Series

The Masada series consists of well drained, moderately permeable soils on high stream terraces. These soils formed in old alluvium. Slopes range from 2 to 15 percent.

Typical pedon of Masada sandy clay loam, 2 to 8 percent slopes, eroded; about 6 miles north of the town of Pinnacle; 0.4 mile west on Secondary Road 1200 from its intersection with Secondary Road 1199, about 50 feet south of the road, in a cultivated field (State plane coordinates 974,200 feet N., 1,580,600 feet E.):

Ap—0 to 10 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium granular structure; friable; common fine roots; about 10 percent quartzite gravel; moderately acid; clear smooth boundary.

Bt1—10 to 17 inches; strong brown (7.5YR 5/8) clay; few medium prominent yellowish brown (10YR 5/4) mottles in old root channels and few medium prominent red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine roots; common distinct clay films on faces of peds; few fine flakes of mica; about 5 percent quartzite gravel; strongly acid; gradual wavy boundary.

Bt2—17 to 33 inches; yellowish red (5YR 5/6) clay; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; few fine flakes of mica; about 5 percent quartzite gravel; strongly acid; gradual wavy boundary.

Bt3—33 to 42 inches; red (2.5YR 5/6) clay; many medium prominent brownish yellow (10YR 6/8) and common medium distinct red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few faint clay films on faces of peds; few fine flakes of mica; about 5 percent quartzite gravel; strongly acid; gradual wavy boundary.

BC—42 to 57 inches; red (2.5YR 4/8) clay; common medium prominent brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm, sticky and slightly plastic; common fine flakes of mica; about 2 percent quartzite gravel; very strongly acid; gradual smooth boundary.

C—57 to 75 inches; red (2.5YR 4/8) clay loam; common medium prominent brownish yellow (10YR 6/8) mottles; massive; friable; common fine flakes of mica; about 2 percent quartzite gravel; strongly acid.

The solum is 40 to 60 inches thick. The depth to bedrock is more than 72 inches. The content of rock fragments ranges from 0 to 25 percent in the A horizon and from 0 to less than 15 percent in the B horizon. The fragments are mainly gravel and cobbles. In some pedons, lenses of gravel are present in the lower part of the solum and in the C horizon. Few or common flakes of mica are in the B horizon. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8.

The Bt and BC horizons have hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. The uppermost subhorizon of the Bt horizon does not have hue of 2.5YR. The Bt and BC horizons commonly have high-chroma mottles. The Bt horizon is clay, clay loam, or sandy clay. The BC horizon is clay loam, clay, sandy clay, or sandy clay loam or their gravelly modifiers.

The C horizon commonly is in shades of red, yellow, or brown, or it is multicolored. It is clay loam but ranges to loam.

Mayodan Series

The Mayodan series consists of well drained, moderately permeable soils on uplands. These soils formed in material weathered from sedimentary rock, such as mudstone and siltstone (fig. 14). Slopes range from 2 to 45 percent.

Typical pedon of Mayodan fine sandy loam, 2 to 8 percent slopes; about 1 mile east of Walnut Cove; 0.2 mile west on Secondary Road 1918 from its intersection with Secondary Road 1917, about 200 feet north of the road, in a hardwood forest (State plane coordinates 937,700 feet N., 1,672,800 feet E.):

A—0 to 2 inches; dark brown (10YR 4/3) fine sandy loam; moderate medium granular structure; very friable; many fine, medium, and coarse roots; few pebbles; strongly acid; clear smooth boundary.

E—2 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable; many fine, medium, and coarse roots; few pebbles; strongly acid; clear smooth boundary.

BE—8 to 13 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt1—13 to 23 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium angular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt2—23 to 34 inches; yellowish red (5YR 5/6) clay; common medium prominent red (2.5YR 4/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; common fine and medium roots; common distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual smooth boundary.

Bt3—34 to 41 inches; reddish brown (5YR 4/4) clay; common medium distinct yellowish red (5YR 4/6) mottles; coarse medium angular blocky structure; firm, sticky and plastic; few fine and medium roots; common distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual smooth boundary.

BC—41 to 49 inches; reddish brown (5YR 4/4) clay loam; common medium prominent light yellowish brown (2.5Y 6/4) mottles; weak medium angular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—49 to 62 inches; dark reddish brown (5YR 3/4) loam that weathered from saprolite; common medium prominent gray (10YR 6/1) mottles; massive; friable; common fine flakes of mica; strongly acid.

The solum is 30 to 50 inches thick. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to less than 15 percent in the A and E horizons and from 0 to 5 percent in the B horizon. The fragments are mainly gravel and cobbles. Few or common flakes of mica are in the B horizon. Unless the surface layer is limed, reaction is very strongly acid to moderately acid in the A horizon and the upper part of the B horizon. It is very strongly acid or strongly acid in the lower part of the B horizon and in the C horizon.

The A or Ap horizon has hue of 5YR to 10YR, value of 2 to 6, and chroma of 2 to 8. It is fine sandy loam or sandy clay loam.

The E horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is fine sandy loam, sandy loam, silt loam, or loamy sand.

The BE horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 2 to 8. It is loam, sandy clay loam, sandy loam, fine sandy loam, or clay loam.

The upper part of the Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is sandy clay loam or clay loam. The lower part has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 3 to 8. Mottles in shades of red, yellow, or brown range from none to many. It is clay, sandy clay, or clay loam.

The BC horizon has hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 2 to 8. It is clay loam, sandy clay loam, loam, or sandy clay.

The C horizon has hue of 10R to 7.5YR, value of 3 to 6, and chroma of 2 to 8. The texture varies but commonly is loam, silty clay loam, clay loam, sandy clay loam, sandy loam, or clay.

Pacolet Series

The Pacolet series consists of well drained, moderately permeable soils on uplands. These soils formed in material weathered from felsic metamorphic and igneous rock (fig. 15), such as quartz-mica gneiss, mica-garnet schist, and granite. Slopes range from 2 to 60 percent.

Typical pedon of Pacolet sandy clay loam, 8 to 15 percent slopes, eroded; about 7 miles east of Danbury; 0.6 mile east on North Carolina Highway 704 from its intersection with North Carolina Highway 772, about 850 feet north of the road, in a field of hay (State plane coordinates 986,600 feet N., 1,680,200 feet E.):

Ap—0 to 8 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium granular structure; friable; many fine roots; common fine flakes of mica; about 5 percent quartz gravel; slightly acid; clear smooth boundary.

Bt1—8 to 12 inches; red (2.5YR 5/8) clay; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; many fine roots; few fine pores; few faint clay films on faces of peds; common fine flakes of mica; about 5 percent quartz gravel; moderately acid; gradual wavy boundary.

Bt2—12 to 23 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few faint clay films on faces of peds; common fine flakes of mica; about 5 percent quartz gravel; moderately acid; gradual wavy boundary.

BC—23 to 36 inches; red (2.5YR 5/6) sandy clay loam; few pockets of clay loam and sandy loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; moderately acid; gradual wavy boundary.

C1—36 to 49 inches; yellowish red (5YR 5/6) sandy loam that weathered from saprolite; few pockets of sandy clay loam; massive; very friable; common fine flakes of mica; strongly acid; gradual wavy boundary.

C2—49 to 65 inches; yellowish red (5YR 5/6) sandy loam that weathered from saprolite; massive; very friable; common fine flakes of mica; moderately acid.

The solum is 20 to 40 inches thick, but the clayey texture extends to a depth of 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 20 percent in the A and E horizons and from 0 to 15 percent in the B horizon. The fragments range from gravel to stones but are mainly gravel and cobbles. All horizons have few or common flakes of mica. Unless the surface layer has been limed, reaction is very strongly acid to slightly acid in the A horizon. It is very strongly acid to moderately acid in the B and C horizons.

The Ap or A horizon commonly has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 8. In some eroded areas it has hue of 2.5YR. Where value is 3, the horizon is less than 6 inches thick. The A or Ap horizon is dominantly fine sandy loam or sandy clay loam, but in some pedons it is their gravelly modifiers.

The BA or BE horizon, if it occurs, has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 3 to 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Mottles that have hue of 5YR to 10YR are few or common. The texture is clay, sandy clay, or clay loam.

The BC horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 6 to 8. It has mottles that are similar in color to those in the Bt horizon. The BC horizon is clay loam, sandy clay loam, or loam.

The C horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. Mottles are in shades of yellow or brown. The texture varies but commonly is loam or sandy loam that weathered from saprolite.

Pinkston Series

The Pinkston series consists of well drained to excessively drained, moderately rapidly permeable soils on steep side slopes in the uplands. These soils formed in material weathered from sedimentary rock, such as siltstone and sandstone. Slopes range from 25 to 45 percent.

Typical pedon of Pinkston loam, in an area of Mayodan-Pinkston complex, 25 to 45 percent slopes; about 4 miles northeast of Walnut Cove; 1 mile west on U.S. Highway 311 from its intersection with Secondary Road 1722, about 1,070 feet north of the highway, in a hardwood forest (State plane coordinates 941,200 feet N., 1,677,600 feet E.):

Oi—1 inch to 0; partly decomposed leaf litter.

A—0 to 5 inches; reddish brown (5YR 4/3) loam; moderate fine granular structure; very friable; common fine and medium and few coarse roots; few channers; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw/Bt—5 to 13 inches; about 80 percent reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable (Bw part); about 20 percent irregularly shaped bodies of strong brown (7.5YR 5/6) clay loam; firm (Bt part); few fine, medium, and coarse roots; common fine and medium pores; common fine flakes of mica; few channers; strongly acid; clear wavy boundary.

C—13 to 21 inches; dark reddish brown (5YR 3/3) gravelly loam; common medium distinct pinkish white (5YR 8/2) mottles; massive; friable; few medium roots; common fine flakes of mica; about 30 percent partly weathered mudstone channers; strongly acid; gradual wavy boundary.

Cr—21 to 28 inches; maroon and gray, partly weathered siltstone; can be dug with difficulty by a spade; abrupt smooth boundary.

R—28 inches; hard siltstone.

The solum is 12 to 30 inches thick. Hard bedrock is at a depth of 20 to 40 inches. Rock fragments range

from 1 to 10 percent in the A and B horizons and from 10 to 30 percent in the C horizon. The fragments consist of sandstone, mudstone, conglomerate, and quartz and are mainly gravel, cobbles, or channers. The content of mica flakes ranges from none to many. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4. The E horizon, if it occurs, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 6. It is loam, fine sandy loam, or sandy loam.

The Bw/Bt horizon has hue of 2.5YR to 10YR, value of 3 to 7, and chroma of 2 to 8. The Bw part is loam, fine sandy loam, or sandy loam. The Bt part is bodies or lenses of sandy clay loam or clay loam.

The C horizon is in shades of brown, yellow, pink, purple, red, and white. It is loam, fine sandy loam, sandy loam, or fine sand in the fine-earth fraction.

Poindexter Series

The Poindexter series consists of well drained, moderately permeable soils on steep side slopes in the uplands. These soils formed in material weathered from mafic and intermediate metamorphic and igneous rock, generally in the form of gneiss and schist. Slopes range from 25 to 60 percent.

Typical pedon of Poindexter fine sandy loam, 25 to 60 percent slopes; near Germanton; 300 feet west on Secondary Road 1953 from its intersection with Secondary Road 2046, about 150 feet north of the road, in a hardwood forest (State plane coordinates 916,300 feet N., 1,640,300 feet E.):

A—0 to 2 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine and few medium and coarse roots; about 5 percent rock fragments, mostly quartz gravel and cobbles; moderately acid; clear smooth boundary.

E—2 to 8 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak coarse granular structure; very friable; common fine, medium, and coarse roots; about 10 percent rock fragments, mainly quartz gravel and cobbles; slightly acid; clear smooth boundary.

Bt—8 to 20 inches; dark yellowish brown (10YR 4/6) clay loam; few medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, very sticky and slightly plastic; few fine and medium roots; few faint clay films on faces of peds; common fine flakes of mica; about 5 percent rock fragments, mainly quartz gravel and cobbles; moderately acid; gradual wavy boundary.

C—20 to 30 inches; fine sandy loam that weathered from saprolite and mottled and streaked in shades of yellow, brown, and green; massive, rock-controlled structure; friable; few fine roots along fractures and planes of less resistant minerals; few fine flakes of mica; about 10 percent quartz and partly weathered gneiss fragments; moderately acid; abrupt smooth boundary.

Cr—30 to 54 inches; dark green and brown, partly weathered gneiss; can be dug with difficulty by a spade; abrupt smooth boundary.

R—54 inches; dark green and brown gneiss.

The solum is 18 to 36 inches thick. Partly weathered bedrock is at a depth of 20 to 40 inches. Hard bedrock is at a depth of 40 to 60 inches. The content of rock fragments ranges from 0 to 10 percent in the A and B horizons. The Bt and C horizons have few to many mica flakes. Reaction is strongly acid to neutral in all horizons unless the surface layer has been limed.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam, sandy loam, loam, or silt loam.

The BE horizon, if it occurs, has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or silt loam.

The Bt horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, loam, or silt loam.

The BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or silt loam.

The C horizon has colors in shades of brown, yellow, black, green, white, or gray. It is fine sandy loam, sandy loam, loam, sandy clay loam, or silty clay loam.

Rion Series

The Rion series consists of well drained, moderately permeable soils on uplands. These soils formed in residuum of felsic metamorphic and igneous rock, in the form of gneiss, schist, or granite. Slopes range from 2 to 60 percent.

Typical pedon of Rion fine sandy loam, 8 to 15 percent slopes; about 6 miles southwest of Francisco; 0.3 mile west on Secondary Road 1210 from its intersection with Secondary Road 1212, about 900 feet northwest on a farm road, 500 feet west of the farm road, in a field of hay (State plane coordinates 984,600 feet N., 1,582,300 feet E.):

Ap—0 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; friable; common fine roots; about 10 percent gravel;

slightly acid; clear smooth boundary.

Bt—8 to 20 inches; strong brown (7.5YR 5/8) sandy clay loam; few medium faint strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; about 5 percent gravel; slightly acid; clear wavy boundary.

BC—20 to 26 inches; yellowish brown (10YR 5/8) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; many fine flakes of mica; about 5 percent gravel; slightly acid; gradual wavy boundary.

C1—26 to 43 inches; brownish yellow (10YR 6/6) fine sandy loam; few pockets of clay in old rock fractures; massive; very friable; many fine flakes of mica; about 5 percent gravel; moderately acid; clear smooth boundary.

C2—43 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam; few pockets of clay in old rock fractures; massive; very friable; many fine flakes of mica; few streaks of soft bedrock; slightly acid.

The solum is 20 to 40 inches thick. The depth to bedrock is more than 60 inches. Mica flakes range from none to common in all horizons. The content of rock fragments ranges from 0 to less than 15 percent throughout the profile. Reaction is very strongly acid to slightly acid throughout the profile.

The Ap or A horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. Where value is 3 or less, the horizon is less than 6 inches thick.

The E horizon, if it occurs, has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam, sandy loam, or loam.

The BA or BE horizon, if it occurs, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam or sandy clay loam.

The Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Reddish yellow, brownish yellow, strong brown, or yellowish brown mottles range from none to common. The texture is sandy clay loam or clay loam.

The BC horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It has mottles similar to those in the Bt horizon. The texture is sandy clay loam, fine sandy loam, or sandy loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam or sandy loam.

Riverview Series

The Riverview series consists of well drained, moderately permeable soils on flood plains. These soils formed in recent alluvium. Slopes range from 0 to 4 percent.

Typical pedon of Riverview loam, in an area of Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded; about 0.3 mile north of Germanton; 0.2 mile north on Secondary Road 1955 from its intersection with North Carolina Highway 8, about 650 feet west of the road, in a cultivated field (State plane coordinates 970,000 feet N., 1,647,400 feet E.):

Ap—0 to 8 inches; brown (7.5YR 5/4) loam; weak medium granular structure; friable; common fine roots; common fine pores; few fine flakes of mica; strongly acid; clear wavy boundary.

Bw1—8 to 19 inches; dark yellowish brown (10YR 4/4) loam; many medium distinct brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few fine pores; common fine flakes of mica; moderately acid; gradual wavy boundary.

Bw2—19 to 28 inches; brown (7.5YR 4/4) loam; common medium faint brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine pores; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw3—28 to 46 inches; yellowish brown (10YR 5/4) loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; common fine black manganese concretions; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—46 to 62 inches; dark yellowish brown (10YR 4/4) loam; few fine prominent strong brown (7.5YR 5/6) and few medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; common fine flakes of mica; strongly acid.

The solum is 24 to 60 inches thick. The depth to bedrock is more than 60 inches. Unless the surface layer has been limed, reaction is very strongly acid to slightly acid in the A horizon. It is very strongly acid to moderately acid in the B and C horizons. Flakes of mica range from none to common in the A and B horizons and are few or common in the C horizon.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 6. Where value and chroma are 3 or less, the horizon is less than 7 inches thick.

The Bw horizon has hue of 7.5YR, value of 4 or 5, and chroma of 3 to 6, or it has hue of 10YR, value of 3 to 5, and chroma of 4 to 8. Some pedons have a Bw subhorizon that has hue of 5YR, value of 4 or 5, and chroma of 3 or 4. In other pedons the Bw horizon is

mottled in shades of brown, yellow, or red. Mottles that have chroma of 2 or less range from none to common below a depth of 24 inches. The texture of the Bw horizon is loam, sandy clay loam, clay loam, silt loam, silty clay loam, or fine sandy loam.

The BC horizon, if it occurs, has the same colors as those of the Bw horizon. It is sandy loam, fine sandy loam, or sandy clay loam.

The buried A and B horizons, if they occur, are below a depth of about 25 inches. They have colors and textures similar to those of the A and B horizons.

The C horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 8. It is loamy fine sand, loamy sand, sandy loam, fine sandy loam, or loam. In some pedons it has strata of sandy clay loam or clay loam, and in other pedons the texture ranges from sand to clay below a depth of about 40 inches.

Sauratown Series

The Sauratown series consists of well drained, moderately permeable soils on ridges and side slopes in the Sauratown Mountain Range. These soils formed in material weathered from felsic metamorphic rock, such as quartzite gneiss (fig. 16) and schistose quartzite. Slopes range from 2 to 60 percent.

Typical pedon of Sauratown channery fine sandy loam, 25 to 60 percent slopes, very stony; about 1 mile northwest of Danbury; 0.8 mile northwest on Secondary Road 2035 from its intersection with North Carolina Highway 89 and continuing on a woods road, 300 feet west of the switchback on the woods road, 100 feet north of the road, in a hardwood forest (State plane coordinates 967,400 feet N., 1,642,000 feet E.):

Oi—2 inches to 0; partly decomposed organic matter and leaves, twigs, and roots.

A—0 to 2 inches; dark brown (10YR 4/3) channery fine sandy loam; weak medium granular structure; very friable; many fine, medium, and coarse roots; few fine flakes of mica; about 30 percent channers and 2 percent stones; extremely acid; clear wavy boundary.

E—2 to 8 inches; yellowish brown (10YR 5/4) channery fine sandy loam; weak medium granular structure; very friable; many fine, medium, and coarse roots; few fine flakes of mica; about 25 percent channers and 2 percent stones; extremely acid; gradual wavy boundary.

BE—8 to 12 inches; yellowish brown (10YR 5/6) channery fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium and few coarse roots; few fine flakes of mica; about 25 percent channers and 2 percent stones; extremely acid; gradual wavy boundary.

Bt1—12 to 26 inches; yellowish brown (10YR 5/8) channery sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine pores; few faint clay films on faces of peds; common fine flakes of mica; about 20 percent channers and 5 percent stones; extremely acid; gradual wavy boundary.

Bt2—26 to 31 inches; brownish yellow (10YR 6/6) channery sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and few medium prominent red (10R 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine pores; few faint clay films on faces of peds; common fine flakes of mica; about 25 percent channers and 5 percent stones; extremely acid; abrupt wavy boundary.

R—31 inches; hard quartzite gneiss bedrock.

The solum is 20 to 40 inches thick. Hard bedrock is at a depth of 20 to 40 inches. Flakes of mica are none or few in the A and E horizons and range from none to common in the B and C horizons. The content of rock fragments ranges from 5 to 50 percent in the A, E, and C horizons and from 5 to 35 percent in the B horizon. The fragments are pebbles, channers, cobbles, flagstones, or stones. Reaction is extremely acid to moderately acid in all horizons unless the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 6. Where value is 3, the horizon is less than 6 inches thick.

The E horizon has hue of 10YR or 2.5Y and value and chroma of 4 to 6. It is fine sandy loam, sandy loam, loam, or loamy fine sand in the fine-earth fraction.

The BE horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is fine sandy loam, loam, or sandy clay loam in the fine-earth fraction.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. It is sandy clay loam, loam, clay loam, or fine sandy loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. It is sandy clay loam, clay loam, loam, or fine sandy loam in the fine-earth fraction.

The C horizon, if it occurs, has hue of 7.5YR or 10YR, value of 6 or 7, and chroma of 6 to 8. It is saprolite that is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The R layer is gray, white, or pale brown quartzite gneiss or schistose quartzite bedrock.

Toccoa Series

The Toccoa series consists of well drained and moderately well drained, moderately rapidly permeable soils on flood plains. These soils formed in recent alluvium. Slopes range from 0 to 4 percent.

Typical pedon of Toccoa fine sandy loam, in an area of Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded; at Germanton; 0.4 mile northeast on Secondary Road 1954 from its intersection with Secondary Road 1955, about 425 feet east of the road, in a field (State plane coordinates 919,600 feet N., 1,637,800 feet E.):

Ap—0 to 9 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium granular structure; very friable; many fine roots; common fine flakes of mica; strongly acid; abrupt wavy boundary.

C1—9 to 17 inches; brown (7.5YR 4/4) fine sandy loam; few medium lenses of reddish yellow (7.5YR 6/6) fine sand at the top of the horizon; massive; very friable; common fine roots; common fine flakes of mica; strongly acid; clear smooth boundary.

C2—17 to 24 inches; strong brown (7.5YR 4/6) sandy loam; massive; very friable; common fine roots; common fine flakes of mica; moderately acid; abrupt wavy boundary.

C3—24 to 40 inches; strong brown (7.5YR 4/6) fine sandy loam; common medium prominent yellowish brown (10YR 5/4) mottles; few medium distinct lenses of reddish yellow (7.5YR 6/6) fine sand at the top of the horizon; massive; very friable; few fine roots; common fine flakes of mica; moderately acid; gradual wavy boundary.

C4—40 to 60 inches; strong brown (7.5YR 5/6) loamy fine sand; few pockets of fine sandy loam; massive; very friable; common fine flakes of mica; slightly acid.

The loamy surface horizon is 6 to 12 inches thick over loamy sediments. The depth to bedrock is more than 60 inches. Unless the surface layer has been limed, reaction ranges from strongly acid to slightly acid throughout the profile, but some part of the 10- to 40-inch control section is moderately acid or slightly acid. All horizons have few to many flakes of mica.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. Where value is 4 or less, the chroma ranges to 6. Where value is 3 or less, the horizon is less than 6 inches thick.

The C horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 3 to 8. It commonly is fine sandy loam or sandy loam. In some pedons, thin strata that range from sand to sandy clay loam are generally less than 10 inches thick. This layer is within 40 inches of the surface. Below this depth, the texture varies from sand to sandy clay loam, or it is stratified and has gravelly layers.

Udorthents

Udorthents consist of areas where the natural soil has been altered by excavation or covered by earthy fill material. These areas are well drained or moderately well drained. Excavated areas are mainly borrow pits but include the cut parts of cut and fill areas and quarries. In most of these areas, the soil material has been removed, exposing the substratum.

The exposed substratum generally is loam, fine sandy loam, sandy loam, or sandy clay loam. Fill areas consist of landfills and low areas that have been covered by earthy material, trees, stumps, and woody waste from construction sites. Fill areas have more than 20 inches of loamy, earthy fill material. Slopes range from nearly level to very steep, and the surface ranges from smooth to irregular.

A typical pedon has not been selected for these soils because they vary. Most areas are deep or very deep except for some of the borrow pits, which are moderately deep to shallow and may have exposed bedrock in some areas. Fill areas are more than 20 inches deep and are as thick as 20 feet in some places. Landfills have household and industrial garbage interlayered with the earthy fill material and are covered by loamy soil material.

Udorthents have colors in shades of red, brown, yellow, white, and gray. The texture varies but typically is loamy. Reaction ranges from extremely acid to slightly acid.

Wateree Series

The Wateree series consists of well drained, moderately rapidly permeable soils on steep side slopes in the uplands. These soils formed in material weathered from felsic metamorphic and igneous rock, in the form of gneiss and schist or granite. Slopes range from 25 to 60 percent.

Typical pedon of Wateree fine sandy loam, in an area of Rion, Pacolet, and Wateree soils, 25 to 60 percent slopes; near Danbury at Moratock Park; 0.2 mile northeast of the Dan River bridge along Secondary Road 1652, about 90 feet northeast of the road (State plane coordinates 970,000 feet N., 1,647,400 feet E.):

Oi—1 inch to 0; partly decomposed leaf litter.

A—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate medium granular structure; very friable; many fine and medium and few coarse

roots; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bw1—5 to 12 inches; brown (7.5YR 4/4) fine sandy loam; few fine distinct dark grayish brown mottles in old root channels and between peds; weak fine subangular blocky structure; very friable; common fine, medium, and coarse roots; few fine flakes of mica; about 10 percent channers; strongly acid; gradual wavy boundary.

Bw2—12 to 23 inches; strong brown (7.5YR 5/6) channery fine sandy loam; weak fine subangular blocky structure; very friable; few fine and common medium and coarse roots; few fine flakes of mica; about 15 percent channers; strongly acid; gradual wavy boundary.

Bw3—23 to 34 inches; strong brown (7.5YR 5/6) channery fine sandy loam; few pockets of sandy clay loam; common medium prominent yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; very friable; few fine and medium roots; few fine flakes of mica; about 15 percent channers; strongly acid; gradual wavy boundary.

C—34 to 37 inches; strong brown (7.5YR 5/6) channery fine sandy loam that weathered from saprolite; few medium faint strong brown (7.5YR 4/6) mottles; massive; very friable; few fine roots; common fine flakes of mica; about 25 percent channers; strongly acid; abrupt wavy boundary.

Cr—37 to 42 inches; brown, gray, and white, partly weathered gneiss; can be dug with difficulty by a spade; abrupt smooth boundary.

R—42 inches; hard gneiss bedrock.

The solum is 14 to 35 inches thick. Partly weathered bedrock is at a depth of 20 to 40 inches. Hard bedrock is at a depth of 40 to more than 60 inches. The content of rock fragments ranges from 0 to 20 percent in the A and B horizons and from 0 to 35 percent in the C horizon. The fragments range in size from channers to stones but are mainly channers. Flakes of mica range from none to common in the A and B horizons and from few to many in the C horizon. Unless the surface layer has been limed, reaction is very strongly acid to moderately acid in the A and B horizons. It is extremely acid to moderately acid in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR, value of 4 to 7, and chroma of 3 or 4. It is fine sandy loam, sandy loam, or loamy sand in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 4 to 8. It is fine sandy loam or sandy loam in the fine-earth fraction and has an average clay content of 7 to 18 percent. In some pedons it has thin layers of loamy sand or sandy clay loam.

The C horizon is multicolored in shades of brown, yellow, white, or black. It is sand, loamy sand, fine sandy loam, or sandy loam in the fine-earth fraction.

Wedowee Series

The Wedowee series consists of well drained, moderately permeable soils on uplands. These soils formed in material weathered from felsic rock (fig. 17), such as meta-arkose and granitic gneiss. Slopes range from 2 to 25 percent.

Typical pedon of Wedowee loam, 8 to 15 percent slopes; about 1.7 miles southeast of Walnut Cove; 0.4 mile south on Secondary Road 2060 from its intersection with Secondary Road 1921, about 600 feet southwest of the dead end road, in a hardwood forest (State plane coordinates 921,800 feet N., 1,669,800 feet E.):

A—0 to 3 inches; brown (10YR 4/3) loam; weak medium granular structure; friable; many fine, medium, and coarse roots; about 5 percent quartz gravel; strongly acid; abrupt smooth boundary.

E—3 to 9 inches; brownish yellow (10YR 6/6) loam; weak medium granular structure; friable; many fine and medium and few coarse roots; about 5 percent quartz gravel; strongly acid; clear wavy boundary.

BE—9 to 13 inches; reddish yellow (7.5YR 6/6) loam; common medium distinct brownish yellow (10YR 6/6) mottles in old root channels; weak medium subangular blocky structure; friable; about 5 percent quartz gravel; strongly acid; clear wavy boundary.

Bt1—13 to 21 inches; strong brown (7.5YR 5/8) clay; few medium prominent brownish yellow (10YR 6/6) mottles in old root channels; moderate medium angular and subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine pores; few faint clay films on faces of peds; about 5 percent quartz gravel; strongly acid; gradual wavy boundary.

Bt2—21 to 36 inches; yellowish red (5YR 5/8) clay; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium angular and subangular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots; few fine pores; few faint clay films on faces of peds; few fine flakes of mica; about 5 percent quartz gravel; strongly acid; gradual wavy boundary.

BC—36 to 48 inches; yellow (10YR 7/6) loam; common medium prominent reddish yellow (5YR 6/6) mottles; weak coarse angular blocky structure; friable; few fine roots; few fine flakes of mica; about

5 percent quartz gravel; strongly acid; gradual wavy boundary.
C—48 to 60 inches; yellow (10YR 7/6) loam that weathered from saprolite; massive; friable; few fine flakes of mica; strongly acid.

The solum is 20 to 50 inches thick. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from none to less than 15 percent in the A horizon. Flakes of mica are none or few in the A horizon and the upper part of the B horizon and range from none to common in the lower part of the B horizon and in the C horizon. Reaction ranges from extremely acid to strongly acid in all horizons unless the surface layer has been limed.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 6. It is loam or fine sandy loam.

The BE horizon has hue of 5YR to 10YR and value and chroma of 4 to 6. It is loam or sandy clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 5 to 8. Mottles in shades of brown or red are in the lower part of the Bt horizon in most pedons and in the upper part in some pedons. The texture is clay or clay loam.

The BC or CB horizon has hue of 2.5YR to 10YR, value of 5 to 7, and chroma of 4 to 8. The texture is clay loam, sandy clay loam, sandy loam, or loam.

The C horizon is yellow or brown saprolite. It is loam, fine sandy loam, sandy loam, or sandy clay loam.

Wilkes Series

The Wilkes series consists of well drained, moderately slowly permeable soils on uplands. These soils formed in material weathered from intermediate and mafic metamorphic and igneous rock (fig. 18), in the form of gneiss and schist or as diabase. Slopes range from 8 to 25 percent.

Typical pedon of Wilkes fine sandy loam, 8 to 15 percent slopes; about 2 miles south of Pinnacle; 200 feet south on Secondary Road 1144 from its intersection with Secondary Road 1242, about 30 feet east of the road, in a cornfield (State plane coordinates 931,000 feet N., 1,576,100 feet E.):

Ap—0 to 6 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium granular structure; very friable; many fine roots; about 10 percent gravel and cobbles; few fine flakes of mica; moderately acid; clear smooth boundary.
Bt—6 to 13 inches; yellowish brown (10YR 5/6) sandy clay loam; few pockets of clay; many medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium angular and subangular blocky structure; friable, very sticky and plastic; common fine roots; few fine pores; few faint clay films on faces of peds; few streaks and bodies of green, white, and gray, partly weathered primary minerals; common fine flakes of mica; about 5 percent quartz and gneiss gravel; slightly acid; clear wavy boundary.
B/C—13 to 16 inches; yellowish brown (10YR 5/8) clay loam (Bt); common pockets of clay; many medium distinct bodies of green, white, yellow, and gray loam that weathered from saprolite and primary minerals (C); weak coarse subangular blocky structure parting to weak thick platy; firm, very sticky and plastic; common faint clay films on faces of peds; common fine flakes of mica; about 10 percent quartz and gneiss gravel; moderately acid; abrupt irregular boundary.
Cr—16 to 43 inches; multicolored, weathered bedrock; few thin clay films in rock fractures; can be dug with difficulty by a spade; abrupt smooth boundary.
R—43 inches; hard bedrock.

The solum is 10 to 20 inches thick over weathered bedrock. The depth to hard bedrock is 40 to more than 60 inches. The content of rock fragments generally is less than 15 percent. Manganese concretions are few or common in some pedons. Reaction is strongly acid to slightly acid in the upper horizons and slightly acid to mildly alkaline in the lower horizons.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It is fine sandy loam, sandy loam, or loam.

The Bt horizon and the Bt part of the B/C horizon have hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Mottles, bodies, or streaks of black, greenish, grayish, or whitish saprolite or primary minerals are few or common in some pedons. The texture is loam, sandy clay loam, clay loam, or clay. The average content of clay is 18 to 35 percent in the control section.

The BC or C/B horizon, if it occurs, has colors and textures similar to those of the Bt horizon.

The C horizon, if it occurs, and the C part of the B/C horizon are multicolored saprolite that weathered from intermediate and mafic igneous and metamorphic rock. The texture is fine sandy loam, sandy loam, or loam.

The Cr horizon is multicolored, weathered intermediate and mafic igneous and metamorphic rock that can be dug with difficulty by hand tools.

The R layer is hard, intermediate and mafic bedrock.

Zion Series

The Zion series consists of well drained, slowly permeable soils on uplands. These soils formed in material weathered from intermediate and mafic metamorphic and igneous rock (fig. 19), in the form of gneiss and schist or diabase. Slopes range from 8 to 15 percent.

Typical pedon of Zion fine sandy loam, in an area of Zion-Wilkes complex, 8 to 15 percent slopes; about 3 miles east of King; 0.7 mile east on Secondary Road 1963 from its intersection with North Carolina Highway 66, about 100 feet northeast of the road, in a field of hay (State plane coordinates 917,500 feet N., 1,617,100 feet E.):

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium granular structure; friable; many fine roots; few fine flakes of mica; few fine pieces of charcoal; about 5 percent gravel; slightly acid; abrupt smooth boundary.

Bt—9 to 21 inches; brownish yellow (10YR 6/8) clay; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm, very sticky and very plastic; common fine roots; common distinct clay films on faces of peds; few fine flakes of mica; slightly acid; gradual wavy boundary.

Bt/C—21 to 31 inches; about 55 percent yellowish brown (10YR 5/6) clay (Bt) and 45 percent pockets of brown, yellow, and green fine sandy loam that weathered from saprolite (C); strong coarse angular blocky rock-controlled structure; firm, very sticky and very plastic (Bt); few fine roots between peds; common fine flakes of mica; slightly acid; clear wavy boundary.

Cr—31 to 39 inches; multicolored, weathered mafic and gneiss bedrock; can be dug with difficulty by a spade; few fine roots in rock fractures; abrupt smooth boundary.

R—39 inches; dark green and black, hard, mafic and gneiss bedrock.

The solum is 20 to 40 inches thick. Hard bedrock is at a depth of 20 to 40 inches. The content of rock fragments is generally less than 15 percent throughout the profile. Flakes of mica range from none to many. Unless the surface layer has been limed, reaction is very strongly acid to moderately acid in the A horizon and the upper part of the B horizon. It is very strongly acid to neutral in the middle part of the B horizon and strongly acid to neutral in the lower part of the B horizon and in the C horizon.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. It is fine sandy loam, sandy loam, or loam.

The BE horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is loam, clay loam, or silt loam.

The Bt horizon and the Bt part of the Bt/C horizon have hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. They are clay, clay loam, or silty clay.

The CB or BC horizon, if it occurs, has colors similar to those of the Bt horizon. It is sandy clay loam, clay loam, or loam.

The C horizon, if it occurs, and the C part of the Bt/C horizon are multicolored, loamy saprolite. Some pedons have tongues of clayey material along old rock fractures.

Formation of the Soils

This section provides general information about formation of the soils. It describes the soil-forming processes and the various geologic materials associated with the soils in Stokes County.

Factors of Soil Formation

Soils are formed by the processes of the environment acting on the geologic material exposed at the earth's surface. The geologic material generally is referred to as parent material, and the environmental processes are climate, plant and animal life, relief, and time. All of these factors affect the formation of every soil. In many places, however, one or two factors are dominant and influence most of the properties of the soil *(4)*.

Parent Material

The soils in Stokes County reflect many of the differences in the geologic material from which they formed. These parent materials are metamorphic, igneous, and sedimentary rocks and fluvial and colluvial sediments. Cecil and Pacolet soils, for example, formed primarily in saprolite that weathered from felsic metamorphic rock, such as quartz-mica gneiss and mica schist. They have a well developed profile that has a red, clayey subsoil dominated by kaolinite clay and bedrock at a depth of more than 60 inches. In contrast, Zion and Wilkes soils formed in mafic and intermediate metamorphic and igneous rock, such as amphibolite gneiss and diabase. They have a well developed profile that has a yellow or brown, clayey or loamy subsoil that has a mixture of montmorillonite and kaolinite clays. The depth to bedrock is 20 to 40 inches in Zion soils and less than 20 inches in Wilkes soils.

Climate

Climate affects soil development primarily through the influence of precipitation and temperature. Precipitation is necessary for biological activity. It also dissolves minerals and moves them through the soil profile. The kinds and growth of organisms in the soil and the speed and extent of chemical and physical reactions in the soil are greatly influenced by temperature.

Stokes County has a warm, humid climate that favors chemical reactions, which result in rapidly decomposing organic matter and decaying parent material and thus enhance the development of the soil. The abundant rainfall leaches soluble bases and carries the finer textured mineral particles downward. Because of the slight variations in climate within the county, the climate probably does not cause significant local variations in the soils.

Plant and Animal Life

Bacteria, fungi, and other relatively simple organisms help to weather rocks and decompose organic matter. The larger plants and animals produce organic matter and translocate elements and material within the soil.

The activities of fungi and micro-organisms take place primarily in the upper few inches of the soil. Earthworms and other small invertebrates slowly but continually mix the upper few inches of the soil. Rodents and other animals sometimes burrow several feet into the developing soils and underlying saprolite, but burrowing has had little effect on the formation of the soils in Stokes County.

Most of the soils in the county formed under hardwood forest. The trees took up elements from the subsoil and deposited them on the surface and added organic matter from fallen leaves and decaying twigs, trunks, and branches.

The length of time that organic matter remains in the soil greatly depends on drainage. Most of the soils in the county are well drained, and oxidation of the organic matter in these soils occurs so rapidly that little organic matter accumulates. Slightly more organic matter accumulates in the surface layer of the somewhat poorly drained Chewacla and Hornsboro soils.

Relief

Relief influences runoff, erosion, drainage, aeration, and exposure to sun and wind. The soils in Stokes County range from nearly level to very steep. The nearly level and gently sloping soils generally form a thicker profile than that of the more sloping soils that have the same parent material. Examples are Cecil

soils that form on the broader, less sloping landscapes and the similar Pacolet soils that form on the narrower, steeper landscapes.

The profile of Cecil soils is thicker than that of Pacolet soils. The increased hazard of erosion and the decreased rate of water infiltration are the main reasons for the thinner profiles on the steeper slopes. Erosion continually removes soil material from the surface, and infiltration is necessary for soil development in the lower part of the profile.

Time

Some differences in soils reflect differences in age. The development of a sequence of horizons in a natural soil takes a long time. Horizons are more strongly developed in the older soils than in the younger soils, assuming both soils formed under the same conditions and in similar parent material. The soils on flood plains, such as Toccoa, Riverview, and Chewacla soils, are generally younger and are less developed than the soils on uplands, such as Cecil, Pacolet, Zion, and Wilkes soils.

Geology and Soils

For the most part, the rock formations of Stokes County are metamorphic in origin. The metamorphism that formed these rocks took place during the Precambrian period and possibly during the early Paleozoic era *(7)*.

The general strike of the rock formations is northeast-southwest. The rock types are mainly in the form of gneiss and schist. The minerals that make up these rocks include quartz and muscovite, primarily from the pre-existing sandy and clayey sediments. The other minerals that make up the composition of each formation depend on the mineralogy of the previous sediments and the degree of metamorphism. Most of the formations contain garnet, staurolite, kyanite, or sillimanite, alone or in combination. These minerals are all indicative of a high degree of metamorphism.

During the late Precambrian period and throughout the Paleozoic era, numerous granitic rock bodies were intruded into the metamorphic rock formations. Quartz monzonite and granodiorite, which are gneissic in places, are the main rock types *(7)*.

During the Triassic period, faulting created a large trench, possibly an inland sea, in which hundreds of feet of sediments were deposited. Today, all that remains of this trench in Stokes County is a trough of sediments about 4 miles wide, extending from the Germanton area on the Forsyth County line northeast into Rockingham County. This trough is known as the Dan River Triassic Basin. The colors of the sediments that make up this basin generally are tan, gray, red, and maroon. The sediments range from sandstones to mudstones and include shale, arkose, and, in a few areas, conglomerate. Thin coal beds and petrified wood have been deposited in this trough.

A few dark gray, fine to medium grained diabase dikes were intruded into the local rocks during the Triassic period. These dikes range from a few inches to more than a hundred feet thick. They are mainly in the southeastern part of the county. Their general strike is slightly west of north. Some faulting has occurred along the boundary of the Sauratown Mountain Anticlinorium and the adjacent Ararat River Synclinorium, but none of these faults have been active in recent times *(7)*.

The formation and development of the soils in the county generally can be categorized into four groups. The first and largest group is the residual soils of the Piedmont. The second group is the soils that formed in recent and old alluvium and generally are adjacent to or near perennial streams. The third group is the residual soils of the Dan River Triassic Basin. The fourth group is the residual and colluvial soils that generally are at elevations of about 1,000 feet above sea level and higher in the Sauratown Mountain Range and on Brown Mountain and Archie's Knob.

The residual soils of the Piedmont formed primarily from metamorphic gneiss and schist and from the intruded granitic and diabase rocks. The soils in this group include the clayey Cecil, Pacolet, Wedowee, and Zion soils and the loamy Rion, Poindexter, Wateree, and Wilkes soils.

Cecil soils are on the least sloping parts of the landscape. In many areas they are underlain by granitic gneiss. Pacolet soils are underlain by gneiss, schist, and granitic rocks on all of the slopes. Wedowee soils generally are underlain by meta-arkose in the southeastern part of the county or by small, scattered granitic rocks. Rion, Poindexter, and Wateree soils generally are on the steeper slopes, where the weathering of the rocks forms very little clay and where the formation of the soils is less extensive. Wilkes and Zion soils are in material weathered from intermediate and mafic gneiss and schist, which generally contain more black and dark green minerals, or on the intruded diabases.

The alluvial soils can be divided into two groups: those that are flooded and those that are not flooded. The loamy Toccoa, Riverview, and Chewacla soils are adjacent to streams on first bottoms and are occasionally flooded. The clayey Dogue and Hornsboro soils formed in the older alluvium on first or second bottoms that are rarely flooded. The more sloping

Dogue soils are not subject to flooding. The clayey Masada soils formed in the oldest alluvium. These soils are not subject to flooding because they are above the present flood level of the streams that deposited them.

The residual soils of the Dan River Triassic Basin are the clayey Mayodan and loamy Pinkston soils. Mayodan soils make up about 90 percent of this group. Pinkston soils, which are on the steeper side slopes, make up the rest.

The residual and colluvial soils of the Sauratown Mountain Range formed primarily from quartzite gneiss and schistose quartzite. Some interlayering of quartz-mica gneiss and mica schist occurs, especially on the lower elevations. The residual soils on the higher elevations are primarily the loamy Sauratown and Ashe soils. Areas of rock outcrop are common along the crests of ridges, on steep side slopes, and on nose slopes. They generally contain a slightly higher percentage of quartz and few weatherable minerals. The coarser textured Ashe soils are intermingled with areas of rock outcrop.

The colluvial soils extend from the base of the steep crests of ridges and from the base of rock outcrop down the mountainsides onto foot slopes. The loamy Brevard and Greenlee soils are in colluvial areas. The clayey Hayesville soils are in areas where quartz-mica gneiss and schist are more prominent, mainly on the lower elevations.

The residual soils on Brown Mountain and Archie's Knob formed mainly from metamorphic rocks, in the form of gneiss and schist. The clayey Hayesville and loamy Cowee soils are dominant in these areas.

The bedrock of the county varies both horizontally and vertically. The variability of the bedrock, along with the highly dissected topography, results in multi-taxa map units or map units that have many inclusions, such as soils in some parts of the county that have a relatively thin profile.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Amphibolite. A metamorphic rock consisting mainly of amphibole and plagioclase with little or no quartz. As the content of quartz increases, the rock grades into hornblende plagioclase gneiss.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Anticline. A configuration of folded, stratified rocks in which the rocks dip in two directions away from a crest, as when the principal rafters of a common gable roof dip away from the ridgepole. The reverse of a syncline. The "ridgepole" or crest is called the axis.

Anticlinorium. A series of anticlines and synclines arranged structurally so that together they form a general arch or anticline.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Arkose. A sandstone containing 25 percent or more of feldspar generally derived from the disintegration of felsic igneous rock.

Atterberg limits. Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plasticity index (PI), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, gneiss, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Clay film. A thin coating of oriented clay on the surface

of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

CMAI (cumulative mean annual increment). The age or rotation at which growing stock of a forest produces the greatest annual growth (for that time period). It is the age at which periodic annual growth and mean annual growth are equal.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvial. Pertaining to material transported and deposited by mass-wasting (direct gravitational action) and local unconcentrated runoff on and at the base of steep slopes.

Colluvium (colluvial). Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cove. The steep or very steep, concave colluvial areas at the head of drainageways in Piedmont and mountainous areas. These areas commonly have higher tree site indexes than surrounding slopes.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Delineation. The process of drawing or plotting features on a map with lines and symbols.

Depth class. Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth to bedrock (in tables). Bedrock is too near the surface for the specified use.

Diabase. A rock of basaltic composition consisting primarily of labradorite and pyroxene and characterized by ophitic texture.

Dike. A long, narrow cross cutting mass of igneous rock

that extends to or crops out on the land surface.

Diorite. A coarse grained igneous rock with the composition of andesite (no quartz or orthoclase). It is composed of about 75 percent plagioclase feldspars with the balance being ferromagnesian silicates.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Engineering index test data. Laboratory test and mechanical analysis of selected soils in the county.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most of the area, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon

and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in tons per acre (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per acre	none
Less than 1 ton per acre	slight
1 to 5 tons per acre	moderate
5 to 10 tons per acre	severe
More than 10 tons per acre	very severe

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fault. A surface of rock rupture along which there has been differential movement.

Felsic rock. A general term for light colored igneous rock and some metamorphic crystalline rock that have an abundance of quartz, feldspars, feldspathoids, and muscovite mica.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, schist, or gneiss 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding. The temporary covering of the surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; growing or living in streams or ponds; produced by river action, as a fluvial plain.

Foot slope. The inclined surface at the base of a hill.

Forest type. A classification of forest land based on the species forming the majority of live-tree stocking.

Frost action (in tables). Freezing and thawing of soil moisture can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gneiss. A coarse grained metamorphic rock in which bands rich in granular minerals alternate with bands in which schistose minerals predominate. It is commonly formed by the metamorphism of granite.

Granite. A coarse grained igneous rock dominated by light colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

Granodiorite. A plutonic rock roughly intermediate in composition between granite and diorite.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr layer.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The hard bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partly molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermediate rock. Igneous or metamorphic crystalline

rock that is intermediate in composition between mafic and felsic rock.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.

Kaolinite. An aluminosilicate clay mineral with a 1:1 layer structure; that is, a silicon tetrahedral sheet alternating with an aluminum octahedral sheet. Little or no expansion occurs when water mixes with the clay.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Low strength. The soil is not strong enough to support loads.

Mafic rock. A dark rock composed predominantly of magnesium silicates. It contains little quartz, feldspar, or muscovite mica.

Meta-arkose. An arkose that has undergone some degree of metamorphism.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mica. A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassium-rich white mica.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Montmorillonite. An aluminosilicate clay mineral with 2:1 layer structure; that is, two silicon tetrahedral sheets enclosing an aluminum octahedral sheet. Considerable expansion may occur when water mixes with the clay.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muscovite. A nonferromagnesian rock-forming silicate mineral with its tetrahedra arranged in sheets. Commonly called "white mica" and sometimes called potassic mica.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Overstory. The portion of the trees in a forest stand forming the upper crown cover.

Paleozoic. An era of geologic time between the Precambrian period and the Triassic period; approximately 600 million years ago to 225 million years ago.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piedmont. The physiographic region of central North Carolina characterized by rolling landscapes formed from the weathering of residual rock material.

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range in moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Pluton. A body of igneous rock that is formed beneath the surface of the earth by consolidation from magma. Sometimes extended to include bodies formed beneath the surface of the earth by the metasomatic replacement of older rock.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Precambrian. The earliest period of geologic time, dating prior to 600 million years ago.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Quartz monzonite. An igneous rock intermediate in composition between granodiorite and granite.

Reaction, soil. A measure of acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	below 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of a road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Schist. A metamorphic rock dominated by fibrous or platy minerals. It has schistose cleavage and is a product of regional metamorphism.

Seasonal high water table. The highest level of a saturated zone (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay

(0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey area slope classes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 60 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil compaction. An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Compaction decreases the extent of voids and increases bulk density.

Soil map unit. A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. They are generally designed to reflect significant differences in use and management.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Soil strength. Load supporting capacity of a soil at specific moisture and density conditions.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Synclinorium. A series of synclines and anticlines arranged structurally so that they form a trough or syncline.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine." The textural classes are defined as follows:

Sands (coarse sand, sand, fine sand, and very fine sand).—Soil material in which the content of sand is 85 percent or more and the percentage of silt plus 1.5 times the percentage of clay does not exceed 15.

Loamy sands (loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand).—Soil material in which, at the upper limit, the content of sand is 85 to 90 percent and the percentage of silt plus 1.5 times the percentage of clay is not less than 15; at the lower limit, the content of sand is 70 to 85 percent and the percentage of silt plus twice the percentage of clay does not exceed 30.

Sandy loams (coarse sandy loam, sandy loam, fine sandy loam, and very fine sandy loam).—Soil material in which the content of clay is 20 percent or less, the percentage of silt plus twice the percentage of clay exceeds 30, and the content of sand is 52 percent or more or soil material in which the content of clay is less than 7 percent, the content of silt is less than 50 percent, and the content of sand is 43 to 52 percent.

Loam.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam.—Soil material that contains 50 or more percent silt and 12 to 27 percent clay or 50 to 80 percent silt and less than 12 percent clay.

Silt.—Soil material that contains 80 or more percent silt and less than 12 percent clay.

Sandy clay loam.—Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 or more percent sand.

Clay loam.—Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam.—Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

Sandy clay.—Soil material that contains 35 or more percent clay and 45 or more percent sand.

Silty clay.—Soil material that contains 40 or more percent clay and 40 or more percent silt.

Clay.—Soil material that contains 40 or more percent clay, less than 45 percent sand, and less than 40 percent silt.

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Triassic. The earliest of the three geologic periods comprised in the Mesozoic era; approximately 225 million years ago to 180 million years ago.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Understory. The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Universal Soil Loss Equation. An equation used to design water erosion control systems. The equation is A=RKLSPC wherein A is the average annual soil loss in tons per acre per year, R is the rainfall factor, K is the soil erodibility factor, L is the length of slope, S is the steepness of slope, P is the conservation practice factor, and C is the cropping and management factor.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace;

land above the lowlands along streams.

Water table (apparent). A thick zone of free water in the soil. The apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table (seasonal high). The highest level of a saturated zone in the soil (the apparent water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Windthrow. The uprooting and tipping over of trees by the wind.

Yield (forest land). The volume of wood fiber from harvested trees taken from a certain unit of area. Yield is usually measured in board feet or cubic feet per acre.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-86 at Danbury, North Carolina)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	46.2	23.3	34.3	72	0	8	3.25	1.85	4.49	6	2.2
February	49.7	25.7	37.7	73	5	7	3.49	1.71	5.02	7	4.9
March	58.7	33.2	46.0	82	15	73	4.33	2.52	5.94	8	1.5
April	69.6	42.3	56.0	89	24	200	3.74	2.14	5.15	7	.0
May	76.9	50.8	63.9	91	31	431	3.86	2.30	5.24	7	.0
June	83.3	59.4	71.4	95	44	642	3.82	1.75	5.58	7	.0
July	86.8	63.8	75.3	98	50	784	4.23	2.41	5.83	7	.0
August	85.8	62.6	74.2	96	47	750	4.03	2.31	5.55	7	.0
September	80.4	55.5	68.0	94	36	540	3.83	1.04	6.06	5	.0
October	70.5	42.8	56.7	86	23	231	3.76	1.27	5.80	6	.0
November	60.7	34.3	47.5	81	14	58	3.15	1.60	4.48	6	.0
December	50.4	26.4	38.4	71	6	19	3.47	1.60	5.07	6	.9
Yearly:											
Average	68.3	43.3	55.8	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	0	---	---	---	---	---	---
Total	---	---	---	---	---	3,743	44.96	38.62	51.03	79	9.5

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-86 at Danbury, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 8	Apr. 25	May 9
2 years in 10 later than--	Apr. 3	Apr. 19	May 3
5 years in 10 later than--	Mar. 22	Apr. 6	Apr. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 22	Oct. 12	Oct. 2
2 years in 10 earlier than--	Oct. 28	Oct. 18	Oct. 7
5 years in 10 earlier than--	Nov. 8	Oct. 30	Oct. 16

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-86 at Danbury, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	204	179	152
8 years in 10	213	189	161
5 years in 10	231	207	177
2 years in 10	250	226	195
1 year in 10	262	237	205

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BrD	Brevard-Greenlee complex, 8 to 25 percent slopes, extremely bouldery	677	0.2
BrE	Brevard-Greenlee complex, 25 to 60 percent slopes, extremely bouldery	3,413	1.2
CcB	Cecil fine sandy loam, 2 to 8 percent slopes	1,790	0.6
CeB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded	8,058	2.8
CeC2	Cecil sandy clay loam, 8 to 15 percent slopes, eroded	1,882	0.6
ChA	Chewacla loam, 0 to 2 percent slopes, occasionally flooded	2,458	0.8
CwD	Cowee gravelly loam, 8 to 25 percent slopes, stony	191	0.1
CwE	Cowee gravelly loam, 25 to 60 percent slopes, stony	183	0.1
DgB	Dogue fine sandy loam, 2 to 8 percent slopes, rarely flooded	2,229	0.8
DgC	Dogue fine sandy loam, 8 to 15 percent slopes	294	0.1
HaC	Hayesville channery fine sandy loam, 8 to 15 percent slopes, very stony	506	0.2
HaD	Hayesville channery fine sandy loam, 15 to 25 percent slopes, very stony	856	0.3
HaE	Hayesville channery fine sandy loam, 25 to 60 percent slopes, very stony	1,085	0.4
HeB	Hayesville-Sauratown complex, 2 to 8 percent slopes	426	0.1
HeC	Hayesville-Sauratown complex, 8 to 15 percent slopes	1,995	0.7
HeD	Hayesville-Sauratown complex, 15 to 25 percent slopes	1,302	0.4
HeE	Hayesville-Sauratown complex, 25 to 60 percent slopes	1,478	0.5
HoA	Hornsboro loam, 0 to 3 percent slopes, rarely flooded	695	0.2
MaB2	Masada sandy clay loam, 2 to 8 percent slopes, eroded	2,946	1.0
MaC2	Masada sandy clay loam, 8 to 15 percent slopes, eroded	2,461	0.8
MnB	Mayodan fine sandy loam, 2 to 8 percent slopes	4,600	1.6
MnC	Mayodan fine sandy loam, 8 to 15 percent slopes	4,277	1.5
MnD	Mayodan fine sandy loam, 15 to 25 percent slopes	3,500	1.2
MoB2	Mayodan sandy clay loam, 2 to 8 percent slopes, eroded	2,940	1.0
MoC2	Mayodan sandy clay loam, 8 to 15 percent slopes, eroded	3,056	1.0
MoD2	Mayodan sandy clay loam, 15 to 25 percent slopes, eroded	919	0.3
MpE	Mayodan-Pinkston complex, 25 to 45 percent slopes	1,581	0.5
MyB	Mayodan-Urban land complex, 2 to 10 percent slopes	533	0.2
PaC	Pacolet gravelly fine sandy loam, 8 to 15 percent slopes	533	0.2
PaD	Pacolet gravelly fine sandy loam, 15 to 25 percent slopes	521	0.2
PcB2	Pacolet sandy clay loam, 2 to 8 percent slopes, eroded	15,962	5.5
PcC2	Pacolet sandy clay loam, 8 to 15 percent slopes, eroded	68,604	23.5
PcD2	Pacolet sandy clay loam, 15 to 25 percent slopes, eroded	42,482	14.6
PuB	Pacolet-Urban land complex, 2 to 8 percent slopes	1,377	0.5
PuC	Pacolet-Urban land complex, 8 to 15 percent slopes	631	0.2
PwC	Pacolet-Wilkes complex, 8 to 15 percent slopes	5,148	1.8
PwD	Pacolet-Wilkes complex, 15 to 25 percent slopes	6,474	2.2
PxE	Poindexter fine sandy loam, 25 to 60 percent slopes	3,520	1.2
RnB	Rion fine sandy loam, 2 to 8 percent slopes	331	0.1
RnC	Rion fine sandy loam, 8 to 15 percent slopes	2,644	0.9
RnD	Rion fine sandy loam, 15 to 25 percent slopes	2,375	0.8
RpE	Rion, Pacolet, and Wateree soils, 25 to 60 percent slopes	49,479	16.9
RtA	Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded	12,599	4.3
RuE	Rock outcrop-Ashe complex, 10 to 80 percent slopes, extremely bouldery	1,317	0.5
SaC	Sauratown channery fine sandy loam, 8 to 15 percent slopes	1,534	0.5
SaD	Sauratown channery fine sandy loam, 15 to 25 percent slopes	755	0.3
SaE	Sauratown channery fine sandy loam, 25 to 60 percent slopes	984	0.3
SuC	Sauratown channery fine sandy loam, 8 to 15 percent slopes, very stony	700	0.2
SuD	Sauratown channery fine sandy loam, 15 to 25 percent slopes, very stony	1,735	0.6
SuE	Sauratown channery fine sandy loam, 25 to 60 percent slopes, very stony	3,501	1.2
Ud	Udorthents, loamy	812	0.3
WeB	Wedowee loam, 2 to 8 percent slopes	226	0.1
WeC	Wedowee loam, 8 to 15 percent slopes	825	0.3
WeD	Wedowee loam, 15 to 25 percent slopes	682	0.2
WkC	Wilkes fine sandy loam, 8 to 15 percent slopes	2,859	1.0
WkD	Wilkes fine sandy loam, 15 to 25 percent slopes	2,204	0.8
ZwC	Zion-Wilkes complex, 8 to 15 percent slopes	1,236	0.4
	Water areas more than 40 acres in size	2,489	0.9
	Water areas less than 40 acres in size	925	0.3
	Total	291,795	100.0

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Tobacco	Corn	Soybeans	Wheat	Oats	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	AUM*
BrD:							
Brevard	VIs	---	---	---	---	---	5.0
Greenlee	VIIs	---	---	---	---	---	4.0
BrE:							
Brevard	VIIs	---	---	---	---	---	---
Greenlee	VIIs	---	---	---	---	---	---
CcB---Cecil	IIe	2,300	90	30	45	70	7.0
CeB2---Cecil	IIIe	2,100	80	25	40	65	6.0
CeC2---Cecil	IVe	1,900	70	20	35	60	5.5
ChA---Chewacla	IIIw	---	125	35	50	70	---
CwD---Cowee	VIs	1,500	50	---	---	---	5.0
CwE---Cowee	VIIs	---	---	---	---	---	---
DgB---Dogue	IIe	2,100	110	35	55	70	9.5
DgC---Dogue	IVe	1,900	100	25	45	60	8.5
HaC---Hayesville	VIs	---	---	---	---	---	5.0
HaD, HaE---Hayesville	VIIs	---	---	---	---	---	4.0
HeB:							
Hayesville	IIe	2,300	90	30	50	65	6.5
Sauratown	IIIe	1,900	60	25	40	55	6.0
HeC:							
Hayesville	IVe	2,100	80	---	45	50	6.0
Sauratown	IVe	1,700	55	20	35	40	5.5
HeD:							
Hayesville	VIe	1,400	65	---	---	---	5.0
Sauratown	VIe	1,300	45	---	---	---	5.0
HeE:							
Hayesville	VIIe	---	---	---	---	---	4.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tobacco	Corn	Soybeans	Wheat	Oats	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	AUM*
HeE:							
Sauratown	VIIe	---	---	---	---	---	4.5
HoA---Hornsboro	IIIw	---	120	45	50	70	9.0
MaB2---Masada	IIIe	2,200	100	35	45	70	8.5
MaC2---Masada	IVe	1,400	90	25	30	55	6.5
MnB---Mayodan	IIe	2,300	85	30	45	70	8.0
MnC---Mayodan	IVe	2,000	70	20	30	60	7.0
MnD---Mayodan	VIe	1,600	55	---	---	---	6.0
MoB2---Mayodan	IIIe	2,000	80	25	40	70	7.0
MoC2---Mayodan	IVe	1,800	65	20	25	55	6.0
MoD2---Mayodan	VIe	1,300	45	---	---	---	5.5
MpE:							
Mayodan	VIIe	---	---	---	---	---	5.0
Pinkston	VIIe	---	---	---	---	---	4.0
MyB**:							
Mayodan	IIe	---	---	---	---	---	---
Urban land	VIIIs	---	---	---	---	---	---
PaC---Pacolet	IVe	1,900	70	20	45	65	5.5
PaD---Pacolet	VIe	1,400	55	---	---	---	4.5
PcB2---Pacolet	IIIe	2,000	75	25	40	65	6.0
PcC2---Pacolet	IVe	1,800	70	20	35	60	5.0
PcD2---Pacolet	VIe	1,300	55	---	---	---	4.5
PuB**:							
Pacolet	IIIe	---	---	---	---	---	---
Urban land	VIIIs	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tobacco	Corn	Soybeans	Wheat	Oats	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	AUM*
PuC**:							
Pacolet	VIe	---	---	---	---	---	---
Urban land	VIIIs	---	---	---	---	---	---
PwC:							
Pacolet	IVe	1,800	70	20	35	60	5.0
Wilkes	VIe	1,400	40	20	25	45	4.5
PwD:							
Pacolet	VIe	1,300	55	---	---	---	4.5
Wilkes	VIIe	1,200	35	---	---	---	4.0
PxE---Poindexter	VIIe	---	---	---	---	---	3.5
RnB---Rion	IIe	2,100	80	30	40	60	6.5
RnC---Rion	IVe	1,800	70	20	35	55	5.5
RnD---Rion	VIe	1,500	55	---	---	---	4.5
RpE:							
Rion	VIIe	---	---	---	---	---	4.0
Pacolet	VIIe	---	---	---	---	---	4.0
Wateree	VIIe	---	---	---	---	---	3.0
RtA:							
Riverview	IIw	2,400	140	35	60	80	8.0
Toccoa	IIw	2,200	90	20	25	35	6.5
RuE:							
Rock outcrop	VIIIs	---	---	---	---	---	---
Ashe	VIIs	---	---	---	---	---	---
SaC---Sauratown	IVe	1,700	55	---	---	---	6.0
SaD---Sauratown	VIe	1,400	45	---	---	---	5.0
SaE---Sauratown	VIIe	---	---	---	---	---	4.5
SuC, SuD---Sauratown	VIs	---	---	---	---	---	4.5
SuE---Sauratown	VIIs	---	---	---	---	---	4.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tobacco	Corn	Soybeans	Wheat	Oats	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	AUM*
Ud Udorthents	VIIe	---	---	---	---	---	---
WeB Wedowee	IIe	2,300	95	40	60	85	6.5
WeC Wedowee	IVe	2,000	80	30	40	75	5.5
WeD Wedowee	VIe	1,400	55	---	---	---	4.5
WkC Wilkes	VIe	1,400	40	20	25	45	4.5
WkD Wilkes	VIIe	1,200	35	---	---	---	4.0
ZwC:							
Zion	IIIe	1,400	50	20	30	40	5.5
Wilkes	VIe	1,400	40	20	25	35	4.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
BrD**:									
Brevard	11R	Moderate	Moderate	Moderate	Slight	Eastern white pine	86	157	Eastern white pine, loblolly pine, northern red oak, yellow-poplar, shortleaf pine, black walnut.
						Virginia pine	---	---	
						Northern red oak	---	---	
						Yellow-poplar	---	---	
						White oak	---	---	
						Chestnut oak	---	---	
Greenlee	8X	Moderate	Moderate	Moderate	Slight	Yellow-poplar	101	109	Eastern white pine, loblolly pine, yellow-poplar.
						White oak	---	---	
						Northern red oak	---	---	
						Scarlet oak	55	38	
						Eastern white pine	83	157	
						Virginia pine	69	107	
						Chestnut oak	---	---	
BrE**:									
Brevard	11R	Severe	Severe	Moderate	Slight	Eastern white pine	86	157	Eastern white pine, loblolly pine, northern red oak, yellow-poplar, shortleaf pine, black walnut.
						Virginia pine	---	---	
						Northern red oak	---	---	
						Yellow-poplar	---	---	
						White oak	---	---	
						Chestnut oak	---	---	
Greenlee	8R	Severe	Severe	Moderate	Slight	Yellow-poplar	101	109	Eastern white pine, loblolly pine, yellow-poplar.
						White oak	---	---	
						Northern red oak	---	---	
						Scarlet oak	55	38	
						Red maple	---	---	
						Eastern white pine	83	157	
						Black locust	---	---	
						Virginia pine	69	107	
						Chestnut oak	---	---	
CcB	8A	Slight	Slight	Slight	Slight	Loblolly pine	83	116	Loblolly pine, shortleaf pine.
Cecil						Virginia pine	71	110	
						White oak	78	60	
						Northern red oak	81	63	
						Scarlet oak	81	63	
						Yellow-poplar	92	93	
CeB2, CeC2	7C	Slight	Moderate	Moderate	Slight	Loblolly pine	72	96	Loblolly pine, shortleaf pine.
Cecil						Shortleaf pine	63	95	
						Virginia pine	65	100	
						White oak	64	47	
						Northern red oak	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
ChA---------- Chewacla	10W	Slight	Moderate	Slight	Moderate	Yellow-poplar------- Loblolly pine------- Green ash---------- Red maple---------- Willow oak---------- American sycamore---	96 95 --- --- --- ---	100 142 --- --- --- ---	Yellow-poplar, loblolly pine, sweetgum, American sycamore.
CwD---------- Cowee	3R	Moderate	Moderate	Slight	Moderate	Chestnut oak-------- Virginia pine------- Scarlet oak--------- Eastern white pine-- Northern red oak----	55 63 52 78 ---	38 96 36 139 ---	Eastern white pine, loblolly pine, shortleaf pine.
CwE---------- Cowee	3R	Severe	Severe	Slight	Moderate	Chestnut oak-------- Virginia pine------- Scarlet oak--------- Eastern white pine-- Northern red oak----	55 63 52 78 ---	38 96 36 139 ---	Eastern white pine, loblolly pine, shortleaf pine.
DgB, DgC-------- Dogue	9A	Slight	Moderate	Slight	Slight	Loblolly pine------- Southern red oak---- American beech------ Yellow-poplar------- White oak---------- Virginia pine------- Red maple----------	90 80 --- 93 80 --- ---	131 62 --- 95 62 --- ---	Loblolly pine.
HaC---------- Hayesville	6A	Slight	Slight	Slight	Slight	Yellow-poplar------- Virginia pine------- Eastern white pine-- Northern red oak---- Chestnut oak-------- White oak----------	92 73 84 --- --- ---	93 113 153 --- --- ---	Eastern white pine, loblolly pine, shortleaf pine.
HaD---------- Hayesville	6R	Moderate	Moderate	Slight	Slight	Yellow-poplar------- Virginia pine------- Eastern white pine-- Northern red oak---- Chestnut oak-------- White oak----------	92 74 85 --- --- ---	93 113 153 --- --- ---	Eastern white pine, loblolly pine, shortleaf pine.
HaE---------- Hayesville	6R	Severe	Severe	Slight	Slight	Yellow-poplar------- Virginia pine------- Eastern white pine-- Northern red oak---- Chestnut oak-------- White oak----------	92 74 85 --- --- ---	93 113 153 --- --- ---	Eastern white pine, loblolly pine, shortleaf pine.
HeB**, HeC**: Hayesville-----	6A	Slight	Slight	Slight	Slight	Yellow-poplar------- Eastern white pine-- Northern red oak---- Virginia pine------- Chestnut oak-------- White oak----------	92 84 --- 73 --- ---	93 153 --- 113 --- ---	Eastern white pine, loblolly pine, shortleaf pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
HeB**, HeC**:									
Sauratown	2D	Slight	Slight	Slight	Moderate	Chestnut oak	48	32	Eastern white pine, loblolly pine, shortleaf pine.
						White oak	---	---	
						Scarlet oak	---	---	
						Northern red oak	---	---	
						Virginia pine	63	96	
HeD**:									
Hayesville	6R	Moderate	Moderate	Slight	Slight	Yellow-poplar	92	93	Eastern white pine, loblolly pine, shortleaf pine.
						Eastern white pine	84	153	
						Northern red oak	---	---	
						Virginia pine	73	113	
Sauratown	2R	Moderate	Moderate	Moderate	Moderate	Chestnut oak	48	32	Eastern white pine, loblolly pine, shortleaf pine.
						White oak	---	---	
						Scarlet oak	---	---	
						Northern red oak	---	---	
						Virginia pine	63	96	
HeE**:									
Hayesville	6R	Severe	Severe	Slight	Slight	Yellow-poplar	92	93	Eastern white pine, loblolly pine, shortleaf pine.
						Eastern white pine	84	153	
						Northern red oak	---	---	
						Virginia pine	73	113	
Sauratown	2R	Severe	Severe	Moderate	Moderate	Chestnut oak	48	32	Eastern white pine, loblolly pine, shortleaf pine.
						White oak	---	---	
						Scarlet oak	---	---	
						Northern red oak	---	---	
						Virginia pine	63	96	
HoA	9W	Slight	Moderate	Moderate	Slight	Loblolly pine	89	129	Loblolly pine.
Hornsboro						Willow oak	---	---	
						Southern red oak	---	---	
						White oak	---	---	
						Yellow-poplar	---	---	
						Red maple	---	---	
MaB2, MaC2	8A	Slight	Slight	Slight	Slight	Loblolly pine	80	110	Loblolly pine, yellow-poplar.
Masada						Southern red oak	70	52	
						Virginia pine	70	109	
						Yellow-poplar	80	71	
						Eastern white pine	82	148	
						White oak	---	---	
MnB, MnC	9A	Slight	Slight	Slight	Slight	Loblolly pine	87	125	Loblolly pine.
Mayodan						Shortleaf pine	---	---	
						Virginia pine	74	114	
						White oak	71	53	
						Yellow-poplar	---	---	
						Southern red oak	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
MnD---------- Mayodan	9R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	87	125	Loblolly pine.
						Shortleaf pine------	---	---	
						Virginia pine-------	74	114	
						White oak-----------	71	53	
						Yellow-poplar-------	---	---	
						Southern red oak----	---	---	
MoB2, MoC2------ Mayodan	8C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	78	107	Loblolly pine.
						Shortleaf pine------	---	---	
						Yellow-poplar-------	---	---	
						Southern red oak----	---	---	
						Virginia pine-------	---	---	
MoD2---------- Mayodan	8R	Moderate	Moderate	Moderate	Slight	Loblolly pine-------	78	107	Loblolly pine.
						Shortleaf pine------	---	---	
						Yellow-poplar-------	---	---	
						Southern red oak----	---	---	
						Virginia pine-------	---	---	
MpE**: Mayodan--------	9R	Severe	Severe	Slight	Slight	Loblolly pine-------	87	125	Loblolly pine.
						Shortleaf pine------	---	---	
						Virginia pine-------	74	114	
						White oak-----------	71	53	
						Yellow-poplar-------	---	---	
						Southern red oak----	---	---	
Pinkston-------	2R	Severe	Severe	Severe	Moderate	Southern red oak----	50	34	Loblolly pine.
						Virginia pine-------	50	68	
						Loblolly pine-------	---	---	
						Shortleaf pine------	---	---	
PaC---------- Pacolet	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	78	107	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine------	70	110	
						Yellow-poplar-------	90	90	
						Virginia pine-------	71	110	
						Northern red oak----	76	58	
						White oak-----------	72	54	
PaD---------- Pacolet	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	78	107	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine------	70	110	
						Yellow-poplar-------	90	90	
						Virginia pine-------	71	110	
						Northern red oak----	76	58	
						Hickory-------------	---	---	
						White oak-----------	72	54	
PcB2, PcC2------ Pacolet	6C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	70	93	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine------	60	88	
						Yellow-poplar-------	80	71	
						Virginia pine-------	---	---	
						White oak-----------	---	---	
						Northern red oak----	---	---	
						Chestnut oak--------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
PcD2--Pacolet	6R	Moderate	Moderate	Moderate	Slight	Loblolly pine	70	93	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine	60	88	
						Yellow-poplar	80	71	
						Virginia pine	---	---	
						White oak	---	---	
						Northern red oak	---	---	
						Chestnut oak	---	---	
PwC**:									
Pacolet	8A	Slight	Slight	Slight	Slight	Loblolly pine	78	107	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine	70	110	
						Yellow-poplar	90	90	
						Virginia pine	---	---	
						Northern red oak	---	---	
						White oak	---	---	
						Chestnut oak	---	---	
Wilkes	7D	Slight	Slight	Slight	---	Loblolly pine	75	101	Loblolly pine.
						Shortleaf pine	63	95	
						White oak	---	---	
						Virginia pine	---	---	
PwD**:									
Pacolet	8R	Moderate	Moderate	Slight	Slight	Loblolly pine	78	107	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine	70	110	
						Yellow-poplar	90	90	
						Virginia pine	---	---	
						Northern red oak	---	---	
						White oak	---	---	
						Chestnut oak	---	---	
Wilkes	7R	Moderate	Moderate	Slight	---	Loblolly pine	75	101	Loblolly pine.
						Shortleaf pine	63	95	
						White oak	---	---	
						Virginia pine	---	---	
PxE--Poindexter	5R	Severe	Severe	Moderate	Slight	Loblolly pine	60	76	Loblolly pine, shortleaf pine.
						Virginia pine	65	100	
						Southern red oak	60	43	
RnB, RnC--Rion	8A	Slight	Slight	Slight	Slight	Loblolly pine	80	110	Loblolly pine, shortleaf pine, yellow-poplar.
						Southern red oak	80	62	
						White oak	70	52	
						Yellow-poplar	90	90	
						Virginia pine	---	---	
RnD--Rion	8R	Moderate	Moderate	Slight	Slight	Loblolly pine	80	110	Loblolly pine, shortleaf pine, yellow-poplar.
						Southern red oak	80	62	
						White oak	70	52	
						Yellow-poplar	90	90	
						Virginia pine	---	---	
RpE**:									
Rion	8R	Severe	Severe	Slight	Slight	Loblolly pine	80	110	Loblolly pine, shortleaf pine, yellow-poplar.
						Southern red oak	80	62	
						White oak	70	52	
						Yellow-poplar	90	90	
						Northern red oak	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
RpE**:									
Pacolet	8R	Severe	Severe	Slight	Slight	Loblolly pine	78	107	Loblolly pine, shortleaf pine, yellow-poplar.
						Shortleaf pine	70	110	
						Yellow-poplar	90	90	
						Virginia pine	---	---	
						Northern red oak	---	---	
						White oak	---	---	
Wateree	7R	Severe	Severe	Moderate	Moderate	Loblolly pine	77	105	Loblolly pine, yellow-poplar.
						Shortleaf pine	69	108	
						Southern red oak	72	54	
						Yellow-poplar	84	79	
						Virginia pine	71	110	
						White oak	68	50	
RtA**:									
Riverview	11W	Slight	Slight	Slight	Slight	Loblolly pine	100	154	Loblolly pine, yellow-poplar, sweetgum.
						Yellow-poplar	110	124	
						Sweetgum	100	100	
						Green ash	---	---	
						Eastern cottonwood	---	---	
Toccoa	9A	Slight	Slight	Slight	Slight	Loblolly pine	90	131	Loblolly pine, yellow-poplar, American sycamore.
						Yellow-poplar	107	119	
						Sweetgum	100	138	
						Southern red oak	---	---	
						Green ash	---	---	
						Eastern cottonwood	---	---	
RuE**:									
Rock outcrop.									
Ashe	3R	Severe	Severe	Moderate	Moderate	Chestnut oak	57	40	Eastern white pine, loblolly pine.
						Eastern white pine	78	144	
						Virginia pine	62	95	
						Pitch pine	---	---	
						Scarlet oak	---	---	
SaC	2D	Slight	Slight	Slight	Moderate	Chestnut oak	48	32	Eastern white pine, loblolly pine, shortleaf pine.
Sauratown						White oak	---	---	
						Scarlet oak	---	---	
						Virginia pine	63	96	
						Table Mountain pine	---	---	
						Pitch pine	---	---	
SaD	2R	Moderate	Moderate	Moderate	Moderate	Chestnut oak	48	32	Eastern white pine, loblolly pine, shortleaf pine.
Sauratown						White oak	---	---	
						Scarlet oak	---	---	
						Virginia pine	63	96	
						Table Mountain pine	---	---	
						Pitch pine	---	---	
SaE	2R	Severe	Severe	Moderate	Moderate	Chestnut oak	48	32	Eastern white pine, loblolly pine, shortleaf pine.
Sauratown						White oak	---	---	
						Scarlet oak	---	---	
						Virginia pine	63	96	
						Table Mountain pine	---	---	
						Pitch pine	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
SuC---------- Sauratown	2D	Slight	Moderate	Moderate	Moderate	Chestnut oak--------	48	32	Eastern white pine, loblolly pine, shortleaf pine.
						White oak----------	---	---	
						Scarlet oak---------	---	---	
						Virginia pine-------	63	96	
						Table Mountain pine-	---	---	
						Pitch pine----------	---	---	
SuD---------- Sauratown	2R	Moderate	Moderate	Moderate	Moderate	Chestnut oak--------	48	32	Eastern white pine, loblolly pine, shortleaf pine.
						White oak----------	---	---	
						Scarlet oak---------	---	---	
						Virginia pine-------	63	96	
						Table Mountain pine-	---	---	
						Pitch pine----------	---	---	
SuE---------- Sauratown	2R	Severe	Severe	Moderate	Moderate	Chestnut oak--------	48	32	Eastern white pine, loblolly pine, shortleaf pine.
						White oak----------	---	---	
						Scarlet oak---------	---	---	
						Virginia pine-------	63	96	
						Table Mountain pine-	---	---	
						Pitch pine----------	---	---	
WeB, WeC-------- Wedowee	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	87	125	Loblolly pine.
						Virginia pine-------	---	---	
						Northern red oak----	64	47	
						White oak----------	---	---	
						Yellow-poplar-------	---	---	
WeD---------- Wedowee	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	87	125	Loblolly pine.
						Virginia pine-------	---	---	
						Northern red oak----	64	47	
						White oak----------	---	---	
						Yellow-poplar-------	---	---	
WkC---------- Wilkes	7D	Slight	Slight	Slight	--------	Loblolly pine-------	75	101	Loblolly pine.
						Post oak-----------	---	---	
						Shortleaf pine------	63	95	
						Southern red oak----	---	---	
						White oak----------	---	---	
						Virginia pine-------	---	---	
WkD---------- Wilkes	7R	Moderate	Moderate	Slight	--------	Loblolly pine-------	75	101	Loblolly pine.
						Post oak-----------	---	---	
						Shortleaf pine------	63	95	
						Southern red oak----	---	---	
						White oak----------	---	---	
						Virginia pine-------	---	---	
ZwC**:									
Zion----------	6D	Slight	Slight	Slight	Moderate	Loblolly pine-------	70	93	Loblolly pine.
						Northern red oak----	70	52	
						Virginia pine-------	60	91	
Wilkes---------	7D	Slight	Slight	Slight	--------	Loblolly pine-------	75	101	Loblolly pine.
						Shortleaf pine------	63	95	
						Southern red oak----	---	---	
						White oak----------	---	---	
						Virginia pine-------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BrD*:					
Brevard	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope.
Greenlee	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, droughty, slope.
BrE*:					
Brevard	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
Greenlee	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, droughty, slope.
CcB, CeB2 Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
CeC2 Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
ChA Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CwD Cowee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CwE Cowee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
DgB Dogue	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
DgC Dogue	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
HaC Hayesville	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Severe: large stones.
HaD Hayesville	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.	Severe: large stones, slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HaE Hayesville	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
HeB*: Hayesville	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Sauratown	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, large stones.
HeC*: Hayesville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Sauratown	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones.
HeD*: Hayesville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Sauratown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
HeE*: Hayesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sauratown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
HoA Hornsboro	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
MaB2 Masada	Slight	Slight	Slight	Slight	Slight.
MaC2 Masada	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MnB Mayodan	Slight	Slight	Moderate: slope.	Slight	Slight.
MnC Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MnD Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MoB2 Mayodan	Slight	Slight	Moderate: slope.	Slight	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MoC2--Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MoD2--Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MpE*:					
Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
MyB*:					
Mayodan	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
PaC--Pacolet	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
PaD--Pacolet	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
PcB2--Pacolet	Slight	Slight	Moderate: slope.	Slight	Slight.
PcC2--Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
PcD2--Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PuB*:					
Pacolet	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
PuC*:					
Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Urban land	Variable	Variable	Variable	Variable	Variable.
PwC*:					
Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Wilkes	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
PwD*:					
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PwD*:					
Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
PxE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Poindexter					
RnB	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Rion					
RnC	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Rion					
RnD	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rion					
RpE*:					
Rion	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wateree	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RtA*:					
Riverview	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Moderate: flooding.
Toccoa	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Moderate: flooding.
RuE*:					
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
Ashe	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
SaC	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones.
Sauratown					
SaD	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Sauratown					
SaE	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Sauratown					

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SuC---------- Sauratown	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: slope, small stones.	Moderate: large stones.	Moderate: small stones, large stones, slope.
SuD---------- Sauratown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: large stones, slope.	Severe: slope.
SuE---------- Sauratown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Ud. Udorthents					
WeB---------- Wedowee	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
WeC---------- Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
WeD---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WkC---------- Wilkes	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight----------	Severe: depth to rock.
WkD---------- Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
ZwC*: Zion----------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: droughty, slope, depth to rock.
Wilkes----------	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight----------	Severe: depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BrD*:										
Brevard	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Greenlee	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
BrE*:										
Brevard	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Greenlee	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CcB Cecil	Good	Good	Good	Good	Good	Very poor.	Poor	Good	Good	Very poor.
CeB2 Cecil	Fair	Fair	Good	Good	Good	Very poor.	Poor	Fair	Good	Very poor.
CeC2 Cecil	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ChA Chewacla	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CwD Cowee	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CwE Cowee	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
DgB Dogue	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DgC Dogue	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HaC, HaD, HaE Hayesville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
HeB*:										
Hayesville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sauratown	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
HeC*:										
Hayesville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sauratown	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HeD*:										
Hayesville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sauratown	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
HeE*:										
Hayesville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Sauratown	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HoA---------- Hornsboro	Fair	Good	Good	Good	Good	Good	Fair	Good	Good	Fair.
MaB2---------- Masada	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MaC2---------- Masada	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MnB---------- Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MnC---------- Mayodan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MnD---------- Mayodan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MoB2---------- Mayodan	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
MoC2---------- Mayodan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MoD2---------- Mayodan	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MpE*:										
Mayodan	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pinkston	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MyB*:										
Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
PaC---------- Pacolet	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PaD---------- Pacolet	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
PcB2---------- Pacolet	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
PcC2---------- Pacolet	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
PcD2---------- Pacolet	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
PuB*:										
Pacolet----------	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Urban land.										
PuC*:										
Pacolet----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Urban land.										
PwC*:										
Pacolet----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Wilkes----------	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PwD*:										
Pacolet----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Wilkes----------	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PxE---------- Poindexter	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
RnB---------- Rion	Fair	Good	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
RnC, RnD---------- Rion	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
RpE*:										
Rion----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Pacolet----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Wateree----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
RtA*:										
Riverview---------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
RtA*:										
Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RuE*:										
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Ashe	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
SaC, SaD Sauratown	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
SaE, SuC, SuD, SuE Sauratown	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Ud. Udorthents										
WeB Wedowee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WeC Wedowee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WeD Wedowee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WkC, WkD Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
ZwC*:										
Zion	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BrD*, BrE*:						
Brevard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Greenlee	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, droughty, slope.
CcB, CeB2	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Cecil						
CeC2	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
Cecil						
ChA	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Chewacla						
CwD, CwE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cowee						
DgB	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength.	Moderate: wetness.
Dogue						
DgC	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
Dogue						
HaC	Moderate: too clayey, large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: low strength, slope, frost action.	Severe: large stones.
Hayesville						
HaD, HaE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Hayesville						
HeB*:						
Hayesville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Slight.
Sauratown	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Moderate: depth to rock, frost action.	Moderate: small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HeC*:						
Hayesville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
Sauratown	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: small stones.
HeD*, HeE*:						
Hayesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sauratown	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
HoA--- Hornsboro	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
MaB2--- Masada	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
MaC2--- Masada	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MnB--- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
MnC--- Mayodan	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MnD--- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MoB2--- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
MoC2--- Mayodan	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MoD2--- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MpE*:						
Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MpE*:						
Pinkston	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
MyB*:						
Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
PaC	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
PaD	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcB2	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
PcC2	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
PcD2	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PuB*:						
Pacolet	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
PuC*:						
Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
PwC*:						
Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Wilkes	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Severe: depth to rock.
PwD*:						
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wilkes	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PxE---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RnB---------- Rion	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
RnC---------- Rion	Slight---------	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
RnD---------- Rion	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RpE*:						
Rion----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wateree----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RtA*:						
Riverview--------	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Toccoa----------	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
RuE*:						
Rock outcrop-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
Ashe----------	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
SaC---------- Sauratown	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: small stones, large stones.
SaD, SaE---------- Sauratown	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
SuC---------- Sauratown	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: small stones, large stones, slope.
SuD, SuE---------- Sauratown	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ud. Udorthents						
WeB Wedowee	Moderate: too clayey.	Slight	Slight	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.
WeC Wedowee	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WeD Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WkC Wilkes	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Severe: depth to rock.
WkD Wilkes	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope, depth to rock.
ZwC*: Zion	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: droughty, slope, depth to rock.
Wilkes	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Severe: depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BrD*, BrE*:					
Brevard	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
Greenlee	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
CcB, CeB2	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
CeC2	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, hard to pack.
ChA	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
CwD, CwE	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: depth to rock, slope.
DgB	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
DgC	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
HaC	Moderate: percs slowly, slope, large stones.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
HaD, HaE	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
HeB*:					
Hayesville	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, hard to pack.
Sauratown	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HeC*:					
Hayesville	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Sauratown	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
HeD*, HeE*:					
Hayesville	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
Sauratown	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
HoA Hornsboro	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
MaB2 Masada	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
MaC2 Masada	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
MnB Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
MnC Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
MnD Mayodan	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
MoB2 Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
MoC2 Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
MoD2 Mayodan	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MpE*:					
Mayodan	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Pinkston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
MyB*:					
Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Urban land	Variable	Variable	Variable	Variable	Variable.
PaC	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
PaD	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcB2	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
PcC2	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
PcD2	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PuB*:					
Pacolet	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
Urban land	Variable	Variable	Variable	Variable	Variable.
PuC*:					
Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
Urban land	Variable	Variable	Variable	Variable	Variable.
PwC*:					
Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PwD*:					
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
PxE	Severe: slope, depth to rock.	Severe: seepage, slope, depth to rock.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope, depth to rock.	Poor: slope, depth to rock.
Poindexter					
RnB	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
Rion					
RnC	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope.
Rion					
RnD	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Rion					
RpE*:					
Rion	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wateree	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
RtA*:					
Riverview	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
RuE*:					
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
Ashe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SaC---------- Sauratown	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
SaD, SaE---------- Sauratown	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
SuC---------- Sauratown	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
SuD, SuE---------- Sauratown	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Ud. Udorthents					
WeB---------- Wedowee	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
WeC---------- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
WeD---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
WkC---------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
WkD---------- Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
ZwC*: Zion----------	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Wilkes----------	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BrD*:				
Brevard	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
Greenlee	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
BrE*:				
Brevard	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
Greenlee	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
CcB, CeB2, CeC2 Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
ChA Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CwD Cowee	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
CwE Cowee	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
DgB, DgC Dogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
HaC Hayesville	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones.
HaD Hayesville	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones, slope.
HaE Hayesville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
HeB*, HeC*:				
Hayesville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Sauratown	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
HeD*:				
Hayesville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Sauratown	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
HeE*:				
Hayesville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Sauratown	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
HoA	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Hornsboro				
MaB2, MaC2	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Masada				
MnB, MnC	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mayodan				
MnD	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Mayodan				
MoB2, MoC2	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mayodan				
MoD2	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Mayodan				
MpE*:				
Mayodan	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pinkston	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, depth to rock.
MyB*:				
Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
MyB*:				
Urban land	Variable	Variable	Variable	Variable.
PaC	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Pacolet				
PaD	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pacolet				
PcB2, PcC2	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Pacolet				
PcD2	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pacolet				
PuB*, PuC*:				
Pacolet	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land	Variable	Variable	Variable	Variable.
PwC*:				
Pacolet	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Wilkes	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey.
PwD*:				
Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Wilkes	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey.
PxE	Poor: slope, depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: slope.
Poindexter				
RnB	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Rion				
RnC	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Rion				
RnD	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rion				
RpE*:				
Rion	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
RpE*:				
Pacolet	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Wateree	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RtA*:				
Riverview	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Toccoa	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
RuE*:				
Rock outcrop	Poor: depth to rock, slope.	---	---	Poor: depth to rock, slope.
Ashe	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
SaC Sauratown	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
SaD Sauratown	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
SaE Sauratown	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
SuC Sauratown	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
SuD Sauratown	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
SuE Sauratown	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Ud. Udorthents				
WeB, WeC Wedowee	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WeD Wedowee	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WkC, WkD Wilkes	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
ZwC*:				
Zion	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Wilkes	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BrD*, BrE*:						
Brevard	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones.	Slope, large stones.	Large stones, slope.
Greenlee	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Large stones, slope, droughty.
CcB	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Soil blowing	Favorable.
Cecil						
CeB2	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
Cecil						
CeC2	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
Cecil						
ChA	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Chewacla						
CwD, CwE	Severe: slope.	Severe: thin layer, piping.	Deep to water	Depth to rock, slope.	Depth to rock, slope.	Slope, depth to rock.
Cowee						
DgB	Moderate: seepage, slope.	Severe: wetness.	Slope	Wetness, soil blowing, slope.	Wetness, soil blowing.	Favorable.
Dogue						
DgC	Severe: slope.	Severe: wetness.	Slope	Wetness, soil blowing, slope.	Slope, wetness, soil blowing.	Slope.
Dogue						
HaC, HaD, HaE	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, large stones.	Slope, large stones.	Large stones, slope.
Hayesville						
HeB*:						
Hayesville	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Sauratown	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Slope, large stones, depth to rock.	Large stones, depth to rock.	Large stones, depth to rock.
HeC*, HeD*, HeE*:						
Hayesville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
HeC*, HeD*, HeE*: Sauratown	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
HoA---- Hornsboro	Slight----	Severe: hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
MaB2---- Masada	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope----	Favorable----	Favorable.
MaC2---- Masada	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope----	Slope----	Slope.
MnB---- Mayodan	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
MnC, MnD---- Mayodan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
MoB2---- Mayodan	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope----	Favorable----	Favorable.
MoC2, MoD2---- Mayodan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----	Slope----	Slope.
MpE*: Mayodan----	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----	Slope----	Slope.
Pinkston----	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
MyB*: Mayodan----	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
Urban land----	Variable----	Variable----	Variable----	Variable----	Variable----	Variable.
PaC, PaD---- Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope----	Slope----	Slope.
PcB2---- Pacolet	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----	Favorable----	Favorable.
PcC2, PcD2---- Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope----	Slope----	Slope.
PuB*: Pacolet----	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----	Favorable----	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PuB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
PuC*:						
Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
PwC*, PwD*:						
Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope	Soil blowing, slope.	Slope.
Wilkes	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
PxE	Severe: slope.	Severe: piping, thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Poindexter						
RnB	Severe: seepage.	Severe: piping.	Deep to water	Slope	Soil blowing	Favorable.
Rion						
RnC, RnD	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Soil blowing, slope.	Slope.
Rion						
RpE*:						
Rion	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope	Soil blowing, slope.	Slope.
Wateree	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, depth to rock.	Slope, droughty, depth to rock.
RtA*:						
Riverview	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
Toccoa	Severe: seepage.	Severe: piping.	Flooding	Flooding, soil blowing.	Soil blowing	Favorable.
RuE*:						
Rock outcrop	Severe: depth to rock, slope.	Slight	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Ashe	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope.
SaC, SaD, SaE, SuC, SuD, SuE---						
Sauratown	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ud. Udorthents						
WeB---------- Wedowee	Moderate: slope, seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
WeC, WeD---------- Wedowee	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
WkC, WkD---------- Wilkes	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
ZwC*: Zion----------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock.	Slope, droughty.
Wilkes----------	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
BrD*, BrE*:												
Brevard	0-16	Very flaggy fine sandy loam, flaggy fine sandy loam.	SM, ML	A-2-4, A-4	15-40	35-60	70-90	65-85	55-75	20-55	<35	NP-7
	16-51	Flaggy sandy clay loam, flaggy clay loam, cobbly sandy clay loam.	SM, SC, ML, CL	A-4, A-6, A-7-5, A-7-6	10-20	10-25	85-100	85-95	80-95	35-70	29-50	5-15
	51-65	Flaggy fine sandy loam, flaggy loam, stony fine sandy loam.	SM, SC-SM	A-2-4, A-4	10-20	15-25	80-95	70-90	70-85	15-50	<35	NP-7
Greenlee	0-8	Very flaggy loam.	GM, SM	A-2-4, A-4, A-1-b	30-50	25-65	50-100	50-100	30-85	20-45	<30	NP-7
	8-62	Very flaggy loam, very flaggy sandy loam, very flaggy fine sandy loam.	GM, SM	A-2-4, A-4, A-1-b	30-50	25-65	50-90	50-80	30-60	20-40	<30	NP-7
CcB	0-8	Fine sandy loam.	SM, SC-SM	A-2, A-4	0	0-5	84-100	80-100	67-90	26-42	<30	NP-7
Cecil	8-11	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	75-100	75-100	68-95	38-81	21-35	3-15
	11-55	Clay, clay loam.	MH, ML	A-7, A-5	0	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	55-60	Variable	---	---	0	---	---	---	---	---	---	---
CeB2, CeC2	0-8	Sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	0-5	75-100	75-100	68-95	38-81	21-35	3-15
Cecil	8-55	Clay, clay loam.	MH, ML	A-7, A-5	0	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	55-60	Variable	---	---	---	---	---	---	---	---	---	---
ChA	0-9	Loam	ML, CL, CL-ML	A-4, A-6, A-7	0	0	98-100	95-100	70-100	55-90	25-49	4-20
Chewacla	9-40	Sandy clay loam, loam, sandy loam.	SM, SC-SM, ML, CL	A-4, A-7-6, A-6	0	0	96-100	95-100	60-100	36-70	20-45	2-15
	40-60	Variable	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
CwD, CwE--- Cowee	0-14	Gravelly loam	SM, SC-SM, ML	A-2-4, A-4, A-5, A-2-5	0-2	0-15	75-95	65-85	55-75	20-51	26-41	NP-12
	14-31	Gravelly clay loam, gravelly sandy clay loam, gravelly loam.	SC, CL, ML, SM	A-4, A-6, A-7, A-2	0	0-15	47-99	45-90	32-85	17-60	26-56	5-22
	31-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
DgB, DgC--- Dogue	0-9	Fine sandy loam, loam.	SM, SC, SC-SM	A-2, A-4	0	0	95-100	75-100	50-100	20-50	<25	NP-10
	9-48	Clay loam, clay, sandy clay.	CL, CH, SC	A-6, A-7	0	0	95-100	75-100	65-100	40-90	35-60	16-40
	48-60	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SC-SM	A-2, A-4, A-1	0	0	80-100	60-100	35-100	10-40	<30	NP-10
HaC, HaD, HaE- Hayesville	0-8	Channery fine sandy loam.	SM, SC, ML, CL	A-4	0	25-50	90-100	85-100	60-95	36-75	25-35	NP-10
	8-41	Clay loam, clay, sandy clay loam.	ML, MH, CL, CH	A-6, A-7	0	5-25	90-100	85-100	75-100	60-95	35-70	11-30
	41-53	Sandy clay loam, clay loam.	SM, ML, MH, CL	A-2, A-6, A-7	0	0-5	90-100	85-100	70-100	30-80	30-55	11-25
	53-65	Loam, fine sandy loam.	SM, SC, ML, CL	A-4, A-6	0	5-15	90-100	85-95	60-80	36-65	25-37	NP-12
HeB*, HeC*, HeD*, HeE*: Hayesville---	0-8	Fine sandy loam.	SM, SC, ML, CL	A-4	0	0-5	90-100	85-95	70-95	35-60	25-35	NP-10
	8-41	Clay loam, clay.	ML, MH, CL, CH	A-6, A-7	0	0-5	90-100	85-100	70-100	55-80	36-66	11-35
	41-53	Sandy clay loam, clay loam, loam.	SM, ML, MH, CL	A-6, A-7	0	0-5	90-100	90-100	85-95	45-65	36-55	11-25
	53-65	Fine sandy loam, loam, sandy clay loam.	SM, ML, CL, SC	A-4, A-6	0	0-5	90-100	90-95	65-90	40-55	25-40	NP-12
Sauratown---	0-12	Channery fine sandy loam.	SM, SC-SM	A-2-4, A-4	0-5	10-25	70-90	65-90	55-85	25-50	<30	NP-7
	12-31	Channery sandy clay loam, channery loam, channery clay loam.	SM, SC, ML, CL	A-4, A-6	0-10	15-35	75-95	75-90	65-90	45-75	20-40	4-17
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
HoA---------- Hornsboro	0-15	Loam----------	ML, CL-ML, SM	A-4	0	0	99-100	93-100	85-98	42-85	<35	NP-10
	15-53	Clay, silty clay, silty clay loam.	CH, CL	A-7-6	0	0	99-100	93-100	87-99	60-91	45-70	25-50
	53-77	Sandy clay loam, clay loam, gravelly sandy clay loam.	CL, SC	A-7-6, A-6, A-2-6	0	0	99-100	57-100	40-96	22-80	30-50	18-30
MaB2, MaC2---- Masada	0-10	Sandy clay loam.	CL	A-6	0	0-5	80-100	70-100	60-90	30-55	30-40	15-25
	10-57	Clay loam, clay, sandy clay.	CH, CL	A-7, A-6	0	0-10	80-100	70-100	65-95	50-80	35-60	15-35
	57-75	Loam, clay loam, sandy clay loam.	CL, ML	A-6, A-7, A-4	0	0-10	80-100	70-100	65-95	50-80	30-45	7-20
MnB, MnC, MnD- Mayodan	0-8	Fine sandy loam.	SM, ML	A-2, A-4	0	0-5	92-100	83-100	49-98	30-70	<36	NP-8
	8-23	Silty clay loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7-6	0	0-2	95-100	95-100	90-100	50-98	25-50	7-26
	23-49	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0	0-2	95-100	90-100	80-100	50-98	41-80	15-45
	49-62	Variable------	---	---	0	---	---	---	---	---	---	---
MoB2, MoC2, MoD2--------- Mayodan	0-8	Sandy clay loam.	CL, SC	A-4, A-6, A-7-6	0	0-5	95-100	95-100	90-100	40-90	25-50	7-26
	8-17	Silty clay loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7-6	0	0-2	95-100	95-100	90-100	50-98	25-50	7-26
	17-45	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0	0-2	95-100	90-100	80-100	50-98	41-80	15-45
	45-62	Variable------	---	---	0	---	---	---	---	---	---	---
MpE*: Mayodan------	0-8	Fine sandy loam.	SM, ML	A-2, A-4	0	0-5	92-100	83-100	49-98	30-70	<36	NP-8
	8-23	Silty clay loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7-6	0	0-2	95-100	95-100	90-100	50-98	25-50	7-26
	23-49	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0	0-2	95-100	90-100	80-100	50-98	41-80	15-45
	49-62	Variable------	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
MpE*:												
Pinkston-----	0-5	Loam----------	CL, ML, SC-SM	A-4	0	0-5	80-100	75-100	60-95	45-75	<30	NP-10
	5-13	Loam, sandy loam, gravelly silt loam.	SC, CL, ML, SM	A-2, A-4, A-1	0	0-10	70-100	55-100	35-95	20-75	<30	NP-10
	13-21	Gravelly loam, sandy loam, silt loam.	CL, GM, GP-GM, ML	A-1, A-2, A-4, A-6	0	0-10	40-100	35-85	20-80	10-60	16-35	3-15
	21	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
MyB*:												
Mayodan------	0-8	Fine sandy loam.	SM, ML	A-2, A-4	0	0-5	92-100	83-100	49-98	30-70	<36	NP-8
	8-23	Silty clay loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7-6	0	0-2	95-100	95-100	90-100	50-98	25-50	7-26
	23-49	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0	0-2	95-100	90-100	80-100	50-98	41-80	15-45
	49-62	Variable------	---	---	---	---	---	---	---	---	---	---
Urban land.												
PaC, PaD------ Pacolet	0-5	Gravelly fine sandy loam.	SM	A-2	0-2	0-3	75-90	70-85	55-75	15-30	<30	NP-3
	5-23	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0-1	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	23-36	Clay loam, sandy clay loam, sandy loam.	CL-ML, SC-SM, SC, CL	A-2, A-4, A-6	0-1	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	36-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-1	0-2	80-100	70-100	60-80	30-50	<28	NP-6
PcB2, PcC2, PcD2--------- Pacolet	0-8	Sandy clay loam.	SC-SM, SC	A-4, A-6	0-1	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	8-23	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	23-36	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-1	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	36-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-1	0-2	80-100	70-100	60-90	25-50	<28	NP-6

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
PuB*, PuC*:												
Pacolet	0-8	Sandy clay loam.	SC-SM, SC	A-4, A-6	0-1	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	8-23	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	23-36	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-1	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	36-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-1	0-2	80-100	70-100	60-90	25-50	<28	NP-6
Urban land.												
PwC*, PwD*:												
Pacolet	0-3	Fine sandy loam.	SM, SC-SM	A-2, A-1-b, A-4	0-1	0-2	85-100	80-100	42-90	16-42	<28	NP-7
	3-23	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	23-36	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-1	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	36-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-1	0-2	80-100	70-100	60-90	25-50	<28	NP-6
Wilkes	0-6	Fine sandy loam.	ML, SM	A-2, A-4	0	0-10	90-100	80-100	60-92	25-55	<35	NP-7
	6-16	Clay loam, clay, sandy clay loam.	CL, CH	A-6, A-7	0	0-10	80-100	80-100	75-96	50-85	30-60	11-35
	16-43	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
PxE	0-8	Fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0	0	90-100	85-100	50-100	20-50	<25	NP-10
Poindexter	8-20	Clay loam, sandy clay loam, gravelly loam.	SC, CL	A-6	0	0	90-100	50-100	45-100	35-85	30-40	11-20
	20-30	Fine sandy loam, silty clay loam, loam.	SM, ML, CL-ML, SC-SM	A-2, A-4	0	0	90-100	50-100	45-95	30-70	<20	NP-5
	30-54	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
RnB, RnC, RnD-Rion	0-8	Fine sandy loam.	SM	A-2, A-4	0-1	0-2	90-100	85-100	60-80	20-45	<35	NP-7
	8-20	Sandy clay loam, sandy loam, clay loam.	SC, SC-SM, CL-ML, CL	A-2, A-4, A-6	0-1	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	20-60	Fine sandy loam, sandy clay loam, loamy sand.	SC, SM, SC-SM	A-2, A-4, A-6	0-1	0-2	90-100	80-100	60-85	15-50	<36	NP-12
RpE*:												
Rion	0-8	Fine sandy loam.	SM	A-2, A-4	0-1	0-2	90-100	85-100	60-80	20-45	<35	NP-7
	8-20	Sandy clay loam, sandy loam, clay loam.	SC, SC-SM, CL-ML, CL	A-2, A-4, A-6	0-1	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	20-60	Fine sandy loam, sandy clay loam, loamy sand.	SC, SM, SC-SM	A-2, A-4, A-6	0-1	0-2	90-100	80-100	60-85	15-50	<36	NP-12
Pacolet	0-5	Fine sandy loam.	SM, SC-SM	A-2, A-1-b, A-4	0-1	0-2	85-100	80-100	42-90	16-42	<28	NP-7
	5-23	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	23-36	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-1	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	36-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-1	0-2	80-100	70-100	60-90	25-50	<28	NP-6
Wateree	0-5	Fine sandy loam.	SM	A-2	0-1	0-5	80-100	75-95	45-80	25-35	<30	NP-7
	5-34	Fine sandy loam.	SM	A-2, A-4	0	0-5	85-100	75-98	50-80	25-40	<30	NP-7
	34-37	Channery fine sandy loam, sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0	0-5	70-100	65-98	40-80	5-35	<25	NP-3
	37-42	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
RtA*:												
Riverview----	0-8	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	60-80	15-30	3-14
	8-46	Sandy clay loam, silty clay loam, loam.	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	60-95	20-40	3-20
	46-62	Loam, loamy fine sand, sandy loam, sand.	SM, SC-SM	A-2, A-4	0	0	100	100	50-95	15-45	<20	NP-7
Toccoa-------	0-9	Fine sandy loam.	SM	A-2, A-4	0	0	95-100	95-100	50-85	30-55	<30	NP-4
	9-40	Fine sandy loam, loam, sandy loam.	SM, ML	A-2, A-4	0	0	95-100	90-100	60-100	30-55	<30	NP-4
	40-60	Variable------	---	---	---	---	---	---	---	---	---	---
RuE*:												
Rock outcrop.												
Ashe---------	0-9	Channery fine sandy loam.	SM, SC-SM	A-2, A-4	0-5	30-50	80-90	75-90	60-90	30-49	25-35	NP-7
	9-27	Loam, sandy loam, channery fine sandy loam.	SM, SC-SM	A-4	0-10	5-30	85-100	80-95	60-95	35-49	25-35	NP-7
	27-33	Very flaggy fine sandy loam, very flaggy loamy sand.	SM, GM	A-2, A-4	0-15	15-30	75-95	70-95	55-95	30-49	---	NP
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
SaC, SaD, SaE, SuC, SuD, SuE---------, Sauratown	0-12	Channery fine sandy loam.	SM, SC-SM	A-2-4, A-4	0-15	10-25	70-90	65-90	55-85	25-50	<30	NP-7
	12-31	Channery sandy clay loam, channery loam, channery clay loam.	SM, SC, ML, CL	A-4, A-6	0-10	15-35	75-95	75-90	65-90	45-75	20-40	4-20
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Ud. Udorthents												

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
WeB, WeC, WeD-Wedowee	0-9	Loam	SM, SC-SM	A-4, A-2-4	0	0	95-100	90-100	50-99	23-50	<30	NP-6
	9-13	Loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	0	90-100	90-100	80-97	40-75	<32	NP-15
	13-36	Sandy clay, clay loam, clay.	SC, ML, CL, MH	A-6, A-7	0	0	95-100	95-100	65-97	45-75	30-58	10-30
	36-60	Sandy clay loam, loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	0	80-100	70-100	60-80	30-60	20-35	5-15
WkC, WkD-----Wilkes	0-6	Fine sandy loam.	ML, SM	A-2, A-4	0	0-10	90-100	80-100	60-92	25-55	<35	NP-7
	6-16	Clay loam, clay, sandy clay loam.	CL, CH	A-6, A-7	0	0-10	80-100	80-100	75-96	50-85	30-60	11-35
	16-43	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
ZwC*:												
Zion---------	0-9	Fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0	0-5	85-100	85-100	50-100	20-50	<25	NP-10
	9-21	Clay, silty clay, clay loam.	CH, CL	A-7	0	0	95-100	90-100	85-100	80-95	41-80	20-50
	21-31	Sandy clay loam, clay, clay loam.	CH, SC, CL, ML	A-7	0	0-10	60-100	60-100	50-95	40-85	30-70	11-40
	31-39	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Wilkes-------	0-6	Fine sandy loam.	ML, SM	A-2, A-4	0	0-10	90-100	80-100	60-92	25-55	<35	NP-7
	6-16	Clay loam, clay, sandy clay loam.	CL, CH	A-6, A-7	0	0-10	80-100	80-100	75-96	50-85	30-60	11-35
	16-43	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BrD*, BrE*:										
Brevard	0-16	5-20	1.30-1.45	2.0-6.0	0.08-0.15	4.5-6.0	Low	0.10	5	1-3
	16-51	18-35	1.30-1.50	0.6-2.0	0.11-0.16	4.5-6.0	Low	0.20		
	51-65	8-25	1.35-1.55	2.0-6.0	0.08-0.13	4.5-6.0	Low	0.10		
Greenlee	0-8	5-25	1.30-1.50	2.0-6.0	0.06-0.11	3.6-6.0	Low	0.10	5	2-5
	8-62	5-25	1.40-1.60	2.0-6.0	0.05-0.10	3.6-6.0	Low	0.10		
CcB	0-8	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.5	Low	0.28	4	.5-2
Cecil	8-11	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28		
	11-55	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28		
	55-60	---	---	---	---	---	---	---		
CeB2, CeC2	0-8	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.5	Low	0.28	3	.5-1
Cecil	8-55	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28		
	55-60	---	---	---	---	---	---	---		
ChA	0-9	7-27	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low	0.28	5	1-4
Chewacla	9-40	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low	0.28		
	40-60	---	---	---	---	---	---	---		
CwD, CwE	0-14	8-20	1.25-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low	0.20	2	1-5
Cowee	14-31	18-35	1.30-1.60	0.6-2.0	0.12-0.18	3.6-6.0	Low	0.24		
	31-60	---	---	---	---	---	---	---		
DgB, DgC	0-9	5-20	1.35-1.50	2.0-6.0	0.08-0.15	3.6-5.5	Low	0.28	5	.5-2
Dogue	9-48	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate	0.28		
	48-60	5-40	1.30-1.50	0.6-6.0	0.05-0.14	3.6-5.5	Low	0.17		
HaC, HaD, HaE	0-8	5-20	1.35-1.60	2.0-6.0	0.08-0.14	3.6-5.5	Low	0.15	4	1-3
Hayesville	8-41	35-65	1.30-1.60	0.6-2.0	0.15-0.20	3.6-6.0	Low	0.28		
	41-53	20-40	1.25-1.55	0.6-2.0	0.12-0.20	3.6-6.0	Low	0.28		
	53-65	5-25	1.20-1.50	2.0-6.0	0.11-0.15	3.6-6.0	Low	0.24		
HeB*, HeC*, HeD*, HeE*:										
Hayesville	0-8	5-20	1.35-1.60	2.0-6.0	0.12-0.20	3.6-6.5	Low	0.20	5	1-3
	8-41	35-65	1.20-1.35	0.6-2.0	0.15-0.20	3.6-6.0	Low	0.24		
	41-53	20-40	1.30-1.40	0.6-2.0	0.12-0.20	3.6-6.0	Low	0.20		
	53-65	5-25	1.45-1.65	2.0-6.0	0.11-0.15	3.6-6.0	Low	0.17		
Sauratown	0-12	5-20	1.20-1.40	2.0-6.0	0.10-0.15	3.6-6.0	Low	0.17	2	1-3
	12-31	18-35	1.35-1.60	0.6-2.0	0.10-0.15	3.6-6.0	Low	0.20		
	31	---	---	---	---	---	---	---		
HoA	0-15	7-27	1.40-1.60	0.6-2.0	0.17-0.25	4.5-7.3	Low	0.37	5	1-4
Hornsboro	15-53	35-60	1.40-1.60	0.06-0.2	0.11-0.18	4.5-7.8	High	0.32		
	53-77	22-40	1.40-1.75	0.2-0.6	0.10-0.17	6.1-8.4	Moderate	0.24		
MaB2, MaC2	0-10	20-35	1.45-1.55	0.6-2.0	0.10-0.17	4.5-5.5	Moderate	0.24	4	.5-1
Masada	10-57	35-55	1.30-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Moderate	0.24		
	57-75	25-40	1.30-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Moderate	0.24		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
MnB, MnC, MnD----	0-8	5-20	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	Low----------	0.24	4	.5-2
Mayodan	8-23	20-40	1.30-1.40	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.32		
	23-49	35-60	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	49-62	---	---	---	---	---	----------	----		
MoB2, MoC2, MoD2-	0-8	20-35	1.35-1.55	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.32	3	.5-1
Mayodan	8-17	20-40	1.30-1.40	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.32		
	17-45	35-60	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	45-62	---	---	---	---	---	----------	----		
MpE*:										
Mayodan----------	0-8	7-27	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	Low----------	0.24	4	.5-2
	8-23	20-40	1.30-1.40	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.32		
	23-49	35-60	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	49-62	---	---	---	---	---	----------	----		
Pinkston--------	0-5	5-18	1.20-1.40	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.37	2	.5-2
	5-13	10-18	1.20-1.50	2.0-6.0	0.06-0.18	4.5-5.5	Low----------	0.24		
	13-21	10-20	1.20-1.50	2.0-6.0	0.05-0.16	4.5-5.5	Low----------	0.24		
	21	---	---	0.2-0.6	---	---	----------	----		
MyB*:										
Mayodan----------	0-8	5-20	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	Low----------	0.24	4	.5-2
	8-23	20-40	1.30-1.40	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.32		
	23-49	35-60	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	49-62	---	---	---	---	---	----------	----		
Urban land.										
PaC, PaD----------	0-5	5-20	1.00-1.50	2.0-6.0	0.06-0.10	4.5-6.5	Low----------	0.15	3	.5-2
Pacolet	5-23	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	23-36	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
	36-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
PcB2, PcC2, PcD2-	0-8	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.24	2	.5-1
Pacolet	8-23	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	23-36	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
	36-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
PuB*, PuC*:										
Pacolet----------	0-8	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.24	2	.5-1
	8-23	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	23-36	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
	36-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
Urban land.										
PwC*, PwD*:										
Pacolet----------	0-3	5-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.20	3	.5-2
	3-23	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	23-36	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
	36-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
Wilkes----------	0-6	5-20	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	Low----------	0.24	1	.5-2
	6-16	20-40	1.40-1.60	0.2-0.6	0.15-0.20	6.1-7.8	Moderate-----	0.32		
	16-43	---	---	---	---	---	----------	----		
PxE----------	0-8	5-20	1.30-1.55	2.0-6.0	0.08-0.15	5.1-7.3	Low----------	0.28	3	.5-2
Poindexter	8-20	20-35	1.35-1.45	0.6-2.0	0.13-0.19	5.1-7.3	Low----------	0.24		
	20-30	10-35	1.30-1.55	0.6-6.0	0.08-0.15	5.1-7.3	Low----------	0.24		
	30-54	---	---	0.0-0.06	---	---	----------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
RnB, RnC, RnD----	0-8	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low	0.24	3	.5-2
Rion	8-20	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low	0.20		
	20-60	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low	0.20		
RpE*:										
Rion----------	0-8	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low	0.24	3	.5-2
	8-20	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low	0.20		
	20-60	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low	0.20		
Pacolet---------	0-5	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low	0.20	3	.5-2
	5-23	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.28		
	23-36	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28		
	36-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28		
Wateree---------	0-5	5-20	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	3	<1
	5-34	5-20	1.30-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20		
	34-37	2-15	1.40-1.70	2.0-6.0	0.04-0.12	3.6-6.0	Low	0.17		
	37-42	---	---	---	---	---				
	42	---	---	---	---	---				
RtA*:										
Riverview-------	0-8	7-27	1.30-1.60	0.6-2.0	0.16-0.24	4.5-6.5	Low	0.32	5	.5-2
	8-46	18-35	1.20-1.40	0.6-2.0	0.15-0.22	4.5-6.0	Low	0.24		
	46-62	4-18	1.20-1.50	2.0-6.0	0.07-0.11	4.5-6.0	Low	0.17		
Toccoa----------	0-9	5-20	1.40-1.55	2.0-6.0	0.09-0.12	5.1-6.5	Low	0.10	4	1-2
	9-40	2-19	1.40-1.50	2.0-6.0	0.09-0.12	5.1-6.5				
	40-60	---	---	---	---	---				
RuE*:										
Rock outcrop.										
Ashe----------	0-9	5-20	1.35-1.60	2.0-6.0	0.10-0.12	4.5-6.0	Low	0.15	2	1-5
	9-27	10-25	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low	0.17		
	27-33	5-15	1.45-1.65	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.17		
	33	---	---	---	---	---				
SaC, SaD, SaE,										
SuC, SuD, SuE---	0-12	5-20	1.20-1.40	2.0-6.0	0.10-0.15	3.6-6.0	Low	0.17	2	1-3
Sauratown	12-31	18-35	1.35-1.60	0.6-2.0	0.10-0.15	3.6-6.0	Low	0.20		
	31	---	---	---	---	---				
Ud.										
Udorthents										
WeB, WeC, WeD----	0-9	7-27	1.25-1.60	2.0-6.0	0.10-0.18	4.0-5.5	Low	0.24	3	.5-2
Wedowee	9-13	14-30	1.30-1.55	0.6-2.0	0.12-0.18	4.0-5.5	Low	0.28		
	13-36	35-45	1.30-1.50	0.6-2.0	0.12-0.18	4.0-5.5	Low	0.28		
	36-60	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.0-5.5	Low	0.28		
WkC, WkD----------	0-6	5-20	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	Low	0.24	1	.5-2
Wilkes	6-16	20-40	1.40-1.60	0.2-0.6	0.15-0.20	6.1-7.8	Moderate	0.32		
	16-43	---	---	---	---	---				
ZwC*:										
Zion----------	0-9	5-20	1.30-1.55	2.0-6.0	0.08-0.15	4.5-6.0	Low	0.28	2	.5-2
	9-21	35-60	1.20-1.50	0.06-0.6	0.10-0.19	4.5-7.3	High	0.28		
	21-31	20-50	1.30-1.60	0.2-2.0	0.07-0.20	5.1-7.3	High	0.17		
	31-39	---	---	0.0-0.01	---	---				
	39	---	---	---	---	---				

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
ZwC*:										
Wilkes	0-6	5-20	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	Low	0.24	1	.5-2
	6-16	20-40	1.40-1.60	0.2-0.6	0.15-0.20	6.1-7.8	Moderate	0.32		
	16-43	---	---	---	---	---	---	---		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
BrD*, BrE*:												
Brevard	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Greenlee	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
CcB, CeB2, CeC2--- Cecil	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate.
ChA Chewacla	C	Occasional	Brief to long.	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	---	High	Moderate.
CwD, CwE Cowee	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	High.
DgB Dogue	C	Rare	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	---	High	High.
DgC Dogue	C	None	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	---	High	High.
HaC, HaD, HaE Hayesville	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
HeB*, HeC*, HeD*, HeE*:												
Hayesville	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Sauratown	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Moderate	High.
HoA Hornsboro	D	Rare	---	---	1.0-1.5	Apparent	Nov-May	>60	---	---	Low	Low.
MaB2, MaC2 Masada	C	None	---	---	>6.0	---	---	>60	---	---	High	High.
MnB, MnC, MnD, MoB2, MoC2, MoD2- Mayodan	B	None	---	---	>6.0	---	---	>60	---	---	High	Moderate.
MpE*:												
Mayodan	B	None	---	---	>6.0	---	---	>60	---	---	High	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
MpE*:												
Pinkston	B	None	---	---	>6.0	---	---	20-40	Hard	---	Low	High.
MyB*:												
Mayodan	B	None	---	---	>6.0	---	---	>60	---	---	High	Moderate.
Urban land.												
PaC, PaD, PcB2, PcC2, PcD2--- Pacolet	B	None	---	---	>6.0	---	---	>60	---	---	High	High.
PuB*, PuC*:												
Pacolet	B	None	---	---	>6.0	---	---	>60	---	---	High	High.
Urban land.												
PwC*, PwD*:												
Pacolet	B	None	---	---	>6.0	---	---	>60	---	---	High	High.
Wilkes	C	None	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate.
PxE--- Poindexter	B	None	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Moderate.
RnB, RnC, RnD--- Rion	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	High.
RpE*:												
Rion	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	High.
Pacolet	B	None	---	---	>6.0	---	---	>60	---	---	High	High.
Wateree	B	None	---	---	>6.0	---	---	20-40	Soft	---	Low	High.
RtA*:												
Riverview	B	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-Mar	>60	---	---	Low	Moderate.
Toccoa	B	Occasional	Brief	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---	---	Low	Moderate.
RuE*:												
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---
Ashe	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	High.
SaC, SaD, SaE, SuC, SuD, SuE--- Sauratown	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Moderate	High.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ud. Udorthents												
WeB, WeC, WeD----- Wedowee	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	High.
WkC, WkD---------- Wilkes	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate.
ZwC*: Zion------------	C	None--------	---	---	>6.0	---	---	20-40	Hard	---	High-----	Moderate.
Wilkes-----------	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL ANALYSIS OF SELECTED SOILS

(Dashes indicate that the material was not detected. TR indicates trace amounts of the element. The symbol < means less than; > means more than. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)							Texture class	Coarse fragments		
				Sand						Very fine sand plus silt (0.1-0.002)				
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Sand coarser than very fine (2-0.1)			>2 mm	2-20 mm	20-75 mm
	Pct <2 mm											Pct	Pct	Pct
Dogue fine sandy loam: (S88NC-169-002)														
A----- 0 to 3	57.1	37.8	5.1	0.3	3.6	9.8	23.4	20.0	37.1	57.8	fsl	---	---	---
E----- 3 to 9	51.2	38.0	10.8	0.2	3.0	8.3	21.1	18.6	32.6	56.6	l	---	---	---
Bt1--- 9 to 18	40.9	30.6	28.5	0.4	2.9	8.3	15.7	13.6	27.3	44.2	cl	TR	TR	---
Bt2--- 18 to 25	41.8	20.9	37.3	4.1	6.0	11.1	11.2	9.4	32.4	30.3	cl	5	5	---
Bt3--- 25 to 33	38.4	19.9	41.7	3.5	4.8	8.7	11.4	10.0	28.4	29.9	c	3	3	---
Btg--- 25 to 48	49.7	18.8	31.5	4.3	7.2	11.5	15.7	11.0	28.7	29.8	scl	5	5	---
BCg--- 48 to 60	47.9	26.6	25.5	2.5	6.3	11.8	14.7	12.7	35.2	39.3	scl	3	3	---
Hornsboro loam: (S88NC-169-004)														
A----- 0 to 3	42.6	48.5	8.9	0.2	2.5	7.1	16.2	16.6	26.0	61.5	l	---	---	---
E----- 3 to 8	41.3	49.0	9.7	0.3	2.3	6.4	15.9	16.4	24.9	65.4	l	TR	TR	---
BE---- 8 to 15	34.7	40.4	24.9	1.3	3.1	6.7	12.7	10.9	23.8	51.3	l	1	1	---
Btg1-- 15 to 24	27.4	29.9	42.7	1.3	3.2	5.4	9.6	7.9	19.5	37.8	c	1	1	---
Btg2-- 24 to 33	23.0	22.1	54.9	0.7	2.1	4.5	8.6	7.1	15.9	29.2	c	1	1	---
Bt1--- 33 to 53	32.4	18.6	49.0	1.6	2.4	5.1	11.5	11.8	20.6	30.4	c	1	1	---
Bt2--- 53 to 77	36.4	24.0	39.6	---	0.1	1.5	17.2	17.6	18.8	41.6	cl	1	1	---

TABLE 17.--CHEMICAL ANALYSIS OF SELECTED SOILS

(Dashes indicate that the material was not detected. TR indicates trace amounts of the element. A blank indicates that a determination was not made. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	pH		Extractable cations					Cation-exchange capacity		Extractable acidity	Extractable aluminum	Base saturation		Organic carbon
	H_2O 1:1	KCl 1N 1:1	Ca	Mg	K	Na	Total (TEC)	Ammonium acetate	Sum of cations			Ammonium acetate	Sum of cations	
			Milliequivalents per 100 grams of soil									Pct	Pct	Pct
Dogue fine sandy loam: (S88NC-169-002)														
A--------- 0 to 3	4.3	3.5	0.5	0.1	TR	TR	0.6	5.6	8.7	8.1	1.7	11	7	1.68
E--------- 3 to 9	4.7	4.0	0.1	TR	TR	---	0.1	3.5	5.9	5.8	1.6	3	2	0.33
Bt1------- 9 to 18	4.5	3.5	TR	0.1	0.1	TR	0.2	8.5	11.0	10.8	4.2	2	2	0.25
Bt2------- 18 to 25	4.7	3.5	TR	0.3	0.1	---	0.4	9.7	13.8	13.4	5.2	4	3	0.12
Bt3------- 25 to 33	4.7	3.4	TR	0.3	0.1	---	0.4	11.3	14.9	14.5	6.2	4	3	0.12
Btg------- 33 to 48	4.9	3.3	0.1	0.2	0.1	TR	0.4	13.8	14.4	14.0	7.0	3	3	0.06
BCg------- 48 to 60	4.6	3.2	---	0.1	0.1	0.1	0.3	11.1	12.0	11.7	6.5	3	2	0.06
Hornsboro loam: (S88NC-169-004)														
A--------- 0 to 3	4.6	3.6	0.2	0.1	0.1	0.1	0.5	6.5	8.3	7.8	1.5	8	6	2.05
E--------- 3 to 8	4.6	3.7	TR	0.1	0.1	---	0.2	4.3	9.7	9.5	1.2	5	2	1.06
BE-------- 8 to 15	4.7	3.6	0.3	0.5	TR	TR	0.8	6.8	19.9	9.1	2.3	12	8	0.43
Btg1------ 15 to 24	4.7	3.3	1.6	1.8	0.1	TR	3.5	17.0	18.7	15.2	4.0	21	19	0.35
Btg2------ 24 to 33	4.9	3.4	5.7	5.6	0.2	0.3	11.8	20.3	27.6	15.8	2.8	58	43	0.27
Bt1------- 33 to 53	6.5	4.7	10.3	9.6	0.2	0.6	20.7	22.1	26.2	5.5		94	79	0.17
Bt2------- 53 to 77	7.3	5.4	12.7	11.6	0.5	0.7	25.5	23.5	28.8	3.3		100	89	0.10

TABLE 18.--CLAY MINERALOGY OF SELECTED SOILS

(The pedons for the soils listed are typical of the series in the survey area. Absence of an entry indicates that the mineral was not detected. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, sample number, horizon, and depth in inches	Relative amounts <0.002 mm*						
	Kaolinite	Vermiculite	Mica	Mont-morillonite	Goethite	Hematite	Gibbsite
Dogue fine sandy loam:							
(S88NC-169-002)							
Bt1--- 9 to 18	4	2	1		2		2
Bt3--- 25 to 33	3	2	2			2	
Hornsboro loam:							
(S88NC-169-004)							
BE---- 8 to 15	2	2			2	2	
Btg1-- 15 to 24	3	2	1		3	2	
Btg2-- 24 to 33	3	3	1		2	1	
Bt1--- 33 to 53	4	3	2	3	2	1	
Bt2--- 53 to 77	4	3	2	3			

* Relative amounts: 5--dominant; 4--abundant; 3--moderate; 2--small; 1--trace

TABLE 19.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. NP means nonplastic. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--								Percentage smaller than--					Maximum dry density	Optimum moisture
	Unified	AASHTO	3 inch	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
														Pct		Lb/ft^3	Pct
Mayodan fine sandy loam:* (S87NC-169-3)																	
E---------- 2 to 8	SM	A-4(2)	---	---	---	---	100	99	95	47	28	13	6	18	NP	110.8	12.6
Bt2--------- 23 to 34	CL	A-7-6(16)	---	---	---	---	---	100	98	70	60	47	40	50	28	99.7	21.2
C---------- 34 to 62	ML	A-4(7)	---	---	---	---	---	100	98	71	39	21	16	36	9	106.8	18.4
Sauratown channery fine sandy loam:** (S90NC-169-1)																	
A, E, and BE 0 to 12	SM	A-2-4(0)	---	100	94	88	83	79	76	33	21	14	8	17	3	---	---
Bt1 and Bt2- 12 to 31	SC	A-6(4)	100	98	92	90	89	86	82	46	39	34	28	38	17	---	---

* The plasticity index for the Bt2 horizon is slightly outside the range given in the official series description. This difference does not affect use or management.

** The sample analyzed did not have rock fragments of more than 3 inches.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ashe	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Brevard	Fine-loamy, oxidic, mesic Typic Hapludults
Cecil	Clayey, kaolinitic, thermic Typic Kanhapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Cowee	Fine-loamy, mixed, mesic Typic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Greenlee	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Hayesville	Clayey, kaolinitic, mesic Typic Kanhapludults
Hornsboro	Fine, mixed, thermic Aeric Albaqualfs
Masada	Clayey, mixed, thermic Typic Hapludults
Mayodan	Clayey, mixed, thermic Typic Hapludults
Pacolet	Clayey, kaolinitic, thermic Typic Kanhapludults
Pinkston	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Poindexter	Fine-loamy, mixed, thermic Typic Hapludalfs
Rion	Fine-loamy, mixed, thermic Typic Hapludults
Riverview	Fine-loamy, mixed, thermic Fluventic Dystrochrepts
Sauratown	Fine-loamy, mixed, mesic Typic Hapludults
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Udorthents	Udorthents
Wateree	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Wedowee	Clayey, kaolinitic, thermic Typic Kanhapludults
Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs
Zion	Fine, mixed, thermic Ultic Hapludalfs

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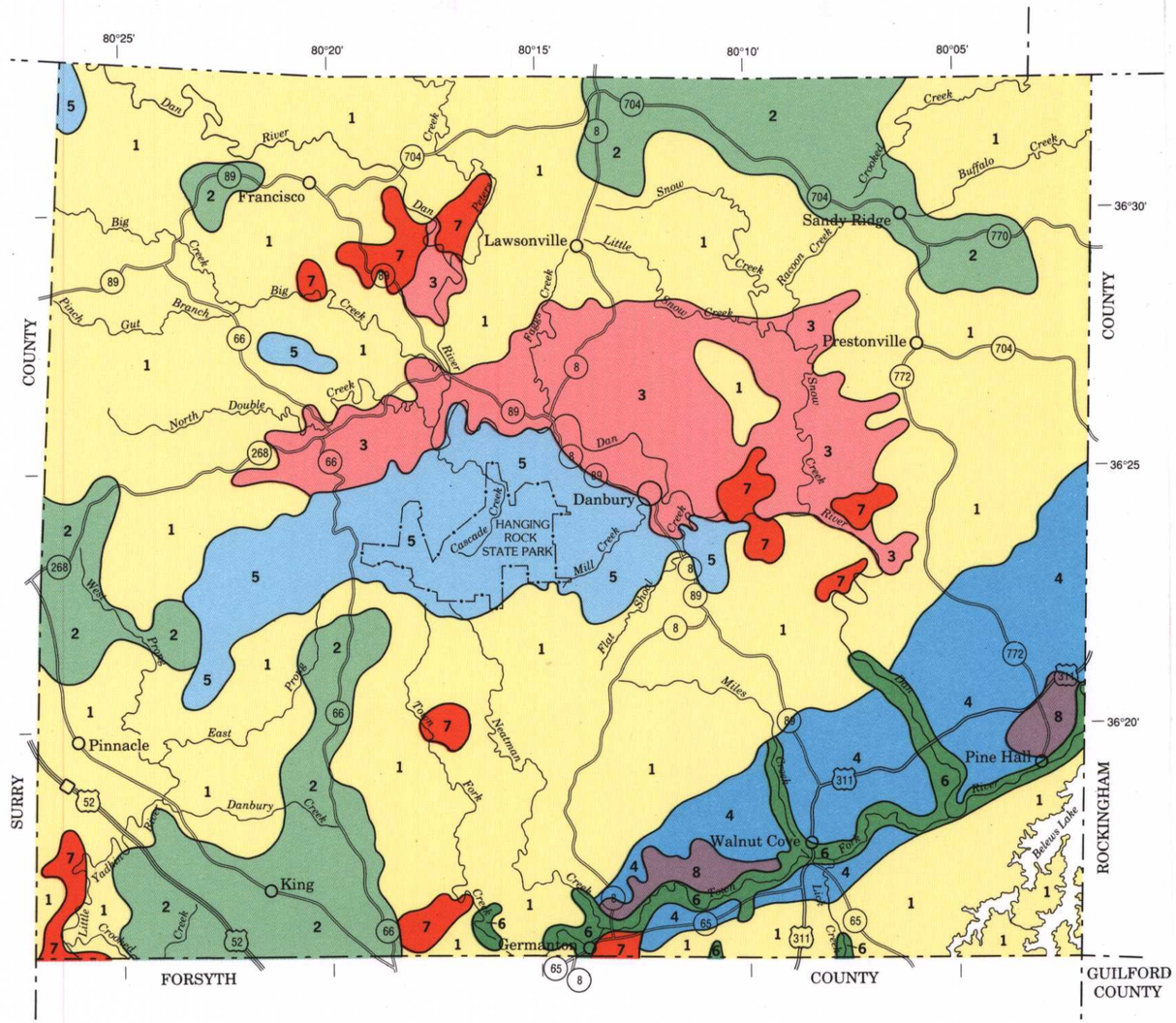


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND*

1	PACOLET-RION
2	PACOLET-CECIL
3	RION-PACOLET-WATEREE
4	MAYODAN
5	SAURATOWN-HAYESVILLE-BREVARD
6	RIVERVIEW-TOCCOA-CHEWACLA
7	POINDEXTER-WILKES
8	MASADA-DOGUE-HORNSBORO

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1995

UNITED STATES DEPARTMENT AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH, AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
STOKES COUNTY SOIL AND WATER CONSERVATION DISTRICT
STOKES COUNTY BOARD OF COMMISSIONERS

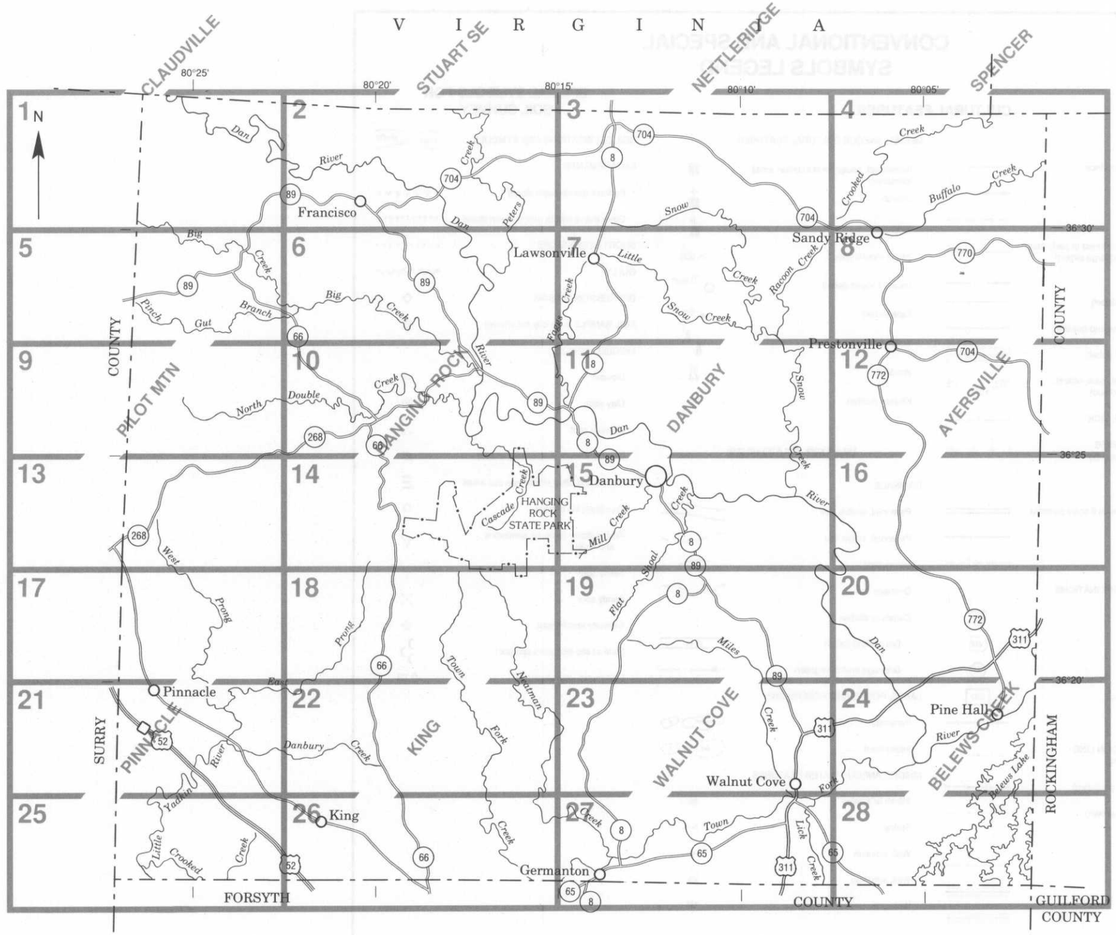
GENERAL SOIL MAP

STOKES COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km



INDEX TO MAP SHEETS

STOKES COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

STOKES COUNTY, NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH, AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
STOKES COUNTY SOIL AND WATER CONSERVATION DISTRICT
STOKES COUNTY BOARD OF COMMISSIONERS

SOIL LEGEND

Soil map unit names are alphabetical. Map symbols are letters and numbers. The first letter is capitalized and is the first letter of the series (or higher level of classification) name. The second letter is lower case. The third letter, where used, is capitalized and denotes the slope phase. The number 2 is used at the end of several map unit symbols and denotes a moderately eroded phase.

SYMBOL	NAME
BrD	Brevard-Greenlee complex, 8 to 25 percent slopes, extremely bouldery
BrE	Brevard-Greenlee complex, 25 to 60 percent slopes, extremely bouldery
CcB	Cecil fine sandy loam, 2 to 8 percent slopes
CeB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded
CeC2	Cecil sandy clay loam, 8 to 15 percent slopes, eroded
ChA	Chewacla loam, 0 to 2 percent slopes, occasionally flooded
CwD	Cowee gravelly loam, 8 to 25 percent slopes, stony
CwE	Cowee gravelly loam, 25 to 60 percent slopes, stony
DgB	Dogue fine sandy loam, 2 to 8 percent slopes, rarely flooded
DgC	Dogue fine sandy loam, 8 to 15 percent slopes
HaC	Hayesville channery fine sandy loam, 8 to 15 percent slopes, very stony
HaD	Hayesville channery fine sandy loam, 15 to 25 percent slopes, very stony
HaE	Hayesville channery fine sandy loam, 25 to 60 percent slopes, very stony
HeB	Hayesville-Sauratown complex, 2 to 8 percent slopes
HeC	Hayesville-Sauratown complex, 8 to 15 percent slopes
HeD	Hayesville-Sauratown complex, 15 to 25 percent slopes
HeE	Hayesville-Sauratown complex, 25 to 60 percent slopes
HoA	Hornsboro loam, 0 to 3 percent slopes, rarely flooded
MaB2	Masada sandy clay loam, 2 to 8 percent slopes, eroded
MaC2	Masada sandy clay loam, 8 to 15 percent slopes, eroded
MnB	Mayodan fine sandy loam, 2 to 8 percent slopes
MnC	Mayodan fine sandy loam, 8 to 15 percent slopes
MnD	Mayodan fine sandy loam, 15 to 25 percent slopes
MoB2	Mayodan sandy clay loam, 2 to 8 percent slopes, eroded
MoC2	Mayodan sandy clay loam, 8 to 15 percent slopes, eroded
MoD2	Mayodan sandy clay loam, 15 to 25 percent slopes, eroded
MpE	Mayodan-Pinkston complex, 25 to 45 percent slopes
MyB	Mayodan-Urban land complex, 2 to 10 percent slopes
PaC	Pacolet gravelly fine sandy loam, 8 to 15 percent slopes
PaD	Pacolet gravelly fine sandy loam, 15 to 25 percent slopes
PcB2	Pacolet sandy clay loam, 2 to 8 percent slopes, eroded
PcC2	Pacolet sandy clay loam, 8 to 15 percent slopes, eroded
PcD2	Pacolet sandy clay loam, 15 to 25 percent slopes, eroded
PuB	Pacolet-Urban land complex, 2 to 8 percent slopes
PuC	Pacolet-Urban land complex, 8 to 15 percent slopes
PwC	Pacolet-Wilkes complex, 8 to 15 percent slopes
PwD	Pacolet-Wilkes complex, 15 to 25 percent slopes
PxE	Poindexter fine sandy loam, 25 to 60 percent slopes
RnB	Rion fine sandy loam, 2 to 8 percent slopes
RnC	Rion fine sandy loam, 8 to 15 percent slopes
RnD	Rion fine sandy loam, 15 to 25 percent slopes
RpE	Rion, Pacolet, and Wateree soils, 25 to 60 percent slopes
RtA	Riverview and Toccoa soils, 0 to 4 percent slopes, occasionally flooded
RuE	Rock outcrop-Ashe complex, 10 to 80 percent slopes, extremely bouldery
SaC	Sauratown channery fine sandy loam, 8 to 15 percent slopes
SaD	Sauratown channery fine sandy loam, 15 to 25 percent slopes
SaE	Sauratown channery fine sandy loam, 25 to 60 percent slopes
SuC	Sauratown channery fine sandy loam, 8 to 15 percent slopes, very stony
SuD	Sauratown channery fine sandy loam, 15 to 25 percent slopes, very stony
SuE	Sauratown channery fine sandy loam, 25 to 60 percent slopes, very stony
Ud	Udorthents, loamy
WeB	Wedowee loam, 2 to 8 percent slopes
WeC	Wedowee loam, 8 to 15 percent slopes
WeD	Wedowee loam, 15 to 25 percent slopes
WkC	Wilkes fine sandy loam, 8 to 15 percent slopes
WkD	Wilkes fine sandy loam, 15 to 25 percent slopes
ZwC	Zion-Wilkes complex, 8 to 15 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline
- AD HOC BOUNDARY (label) — Davis Airstrip
- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE
- STATE COORDINATE TICK — 1 890 000 FEET
- LAND DIVISION CORNER (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate — 79
- Federal — 419
- State — 52
- County, farm or ranch — 1207

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or Small (Named where applicable) — water
- PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban area) (occupied)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
- Double-line (label) — CANAL
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial — water
- Intermittent — int

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — HaD MaC2

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

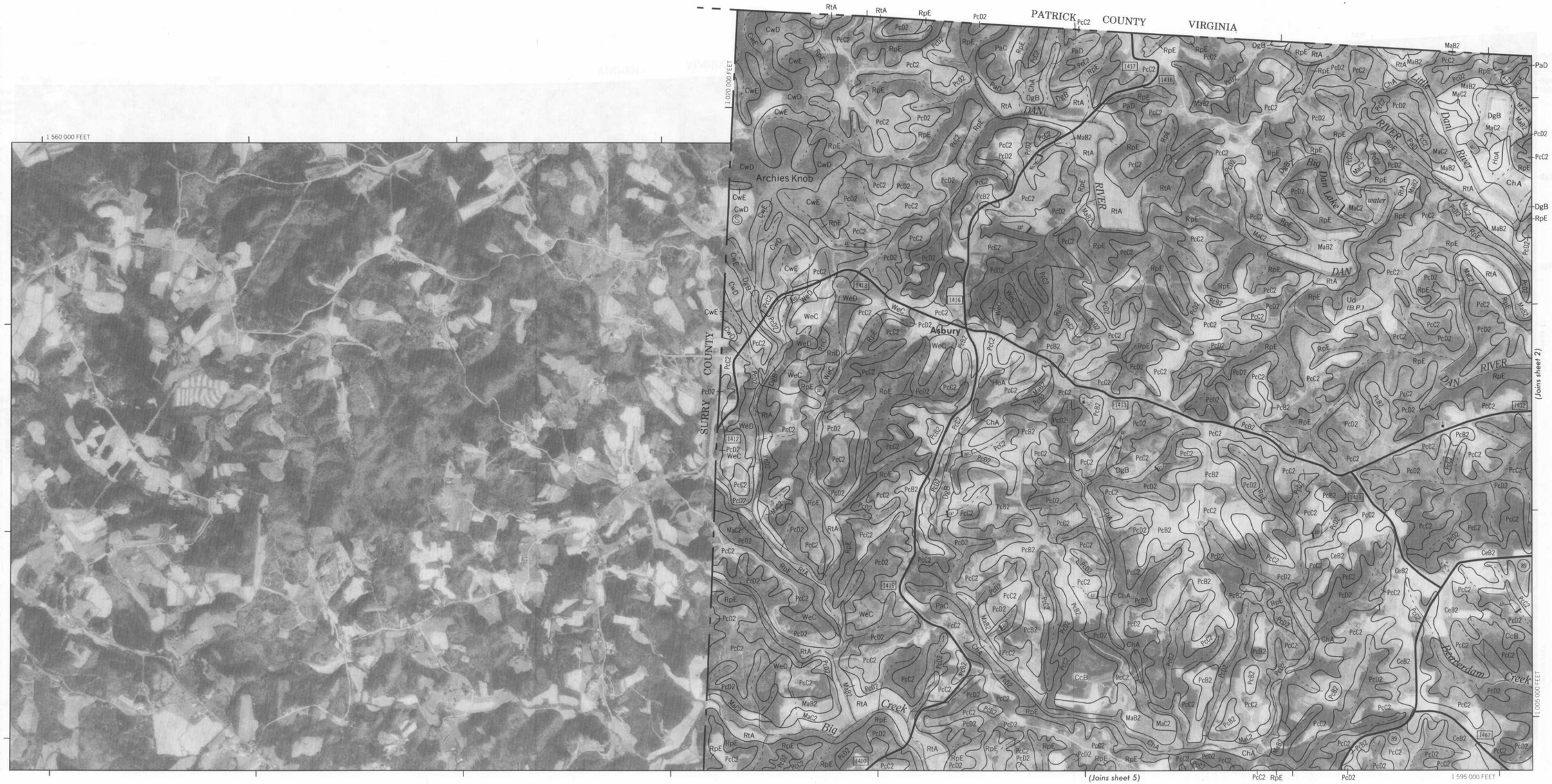
DEPRESSION OR SINK

SOIL SAMPLE (normally not shown) — S

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

SOIL SURVEY OF STOKES COUNTY, NORTH CAROLINA - SHEET NUMBER 1

STOKES COUNTY, NORTH CAROLINA NO. 1



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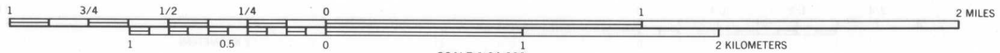
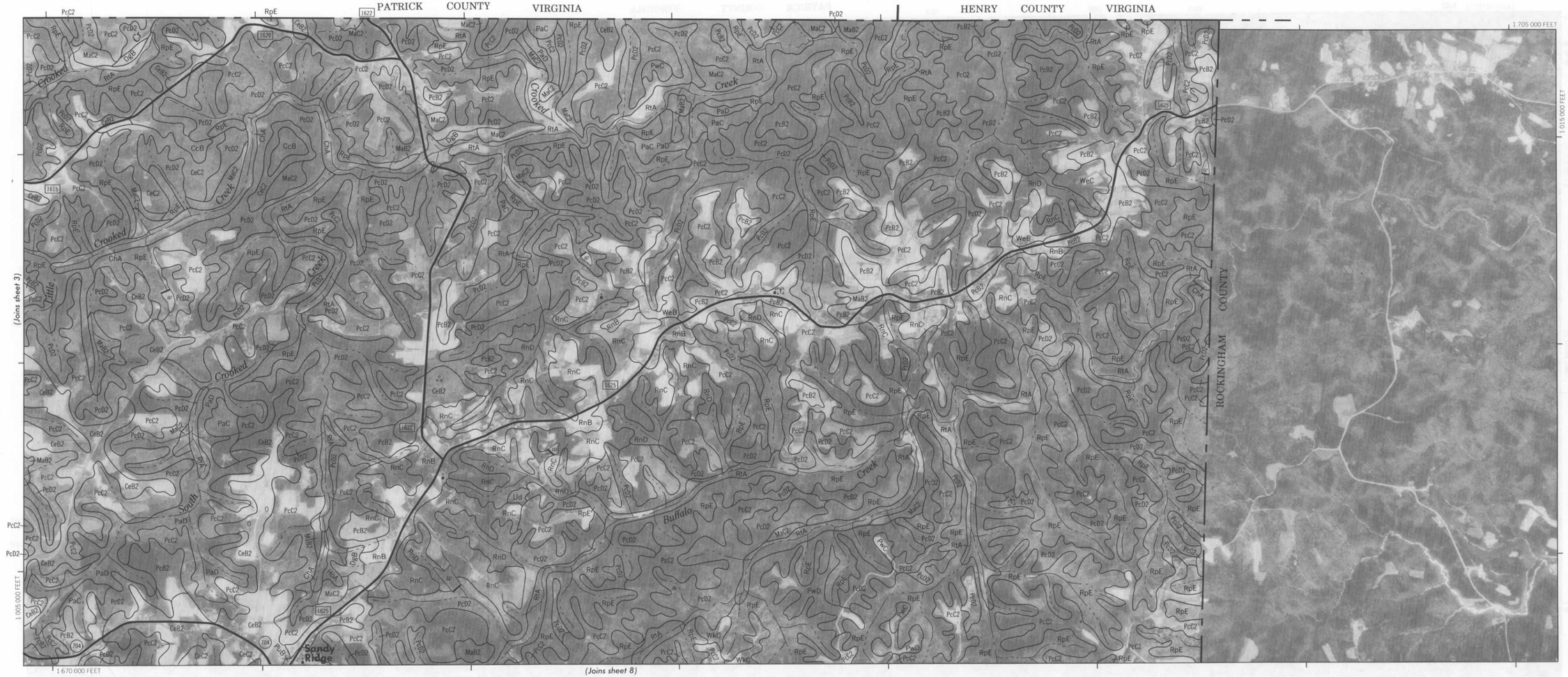


SCALE 1:24 000



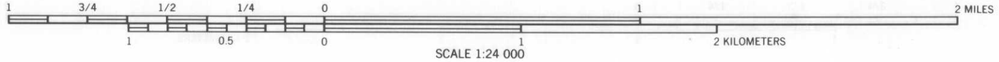
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

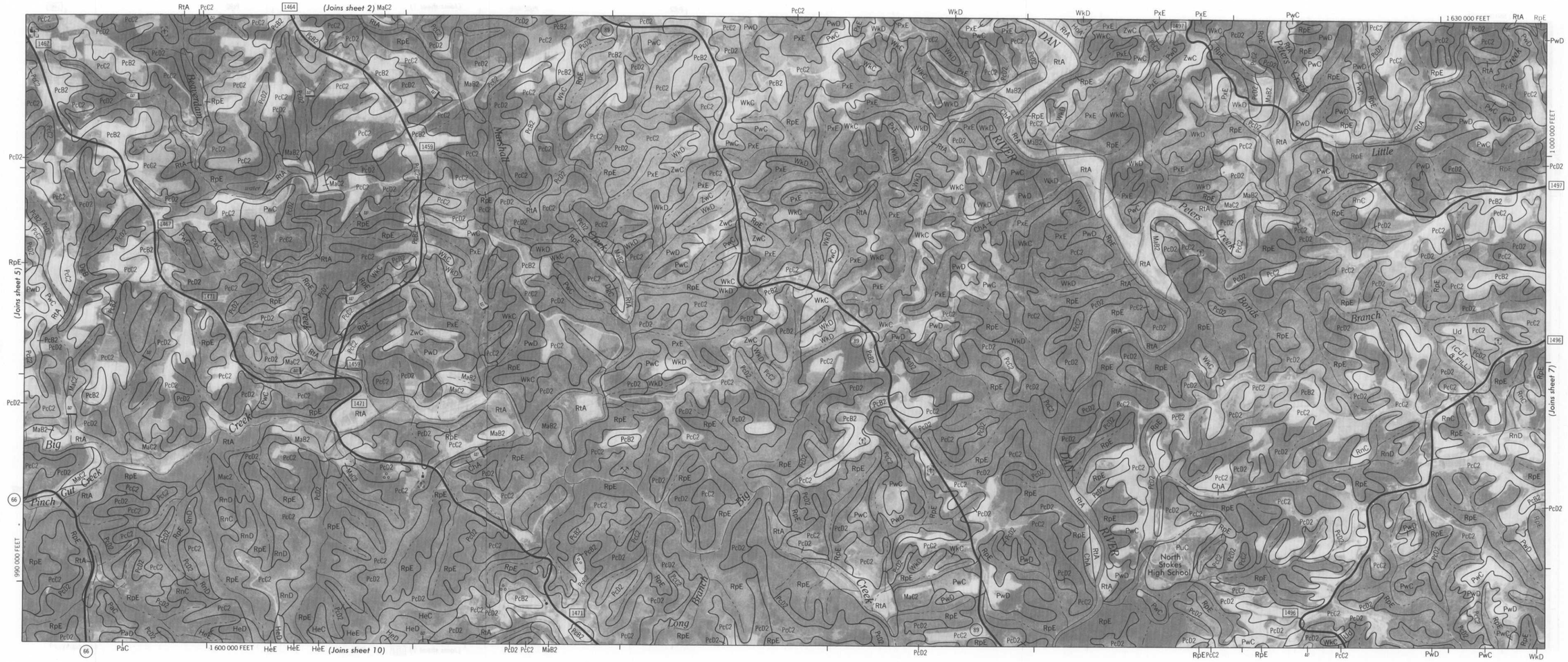
SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 4


1 560 000 FEET
1 000 000 FEET
(Joins sheet 1)
(Joins sheet 6)
(Joins sheet 9)
1 595 000 FEET
990 000 FEET
SURRY COUNTY
Big Meadow Branch
Big Pinch Gut Creek
Pinch Gut Creek
water (Fish Hatchery)


1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

5
N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 6

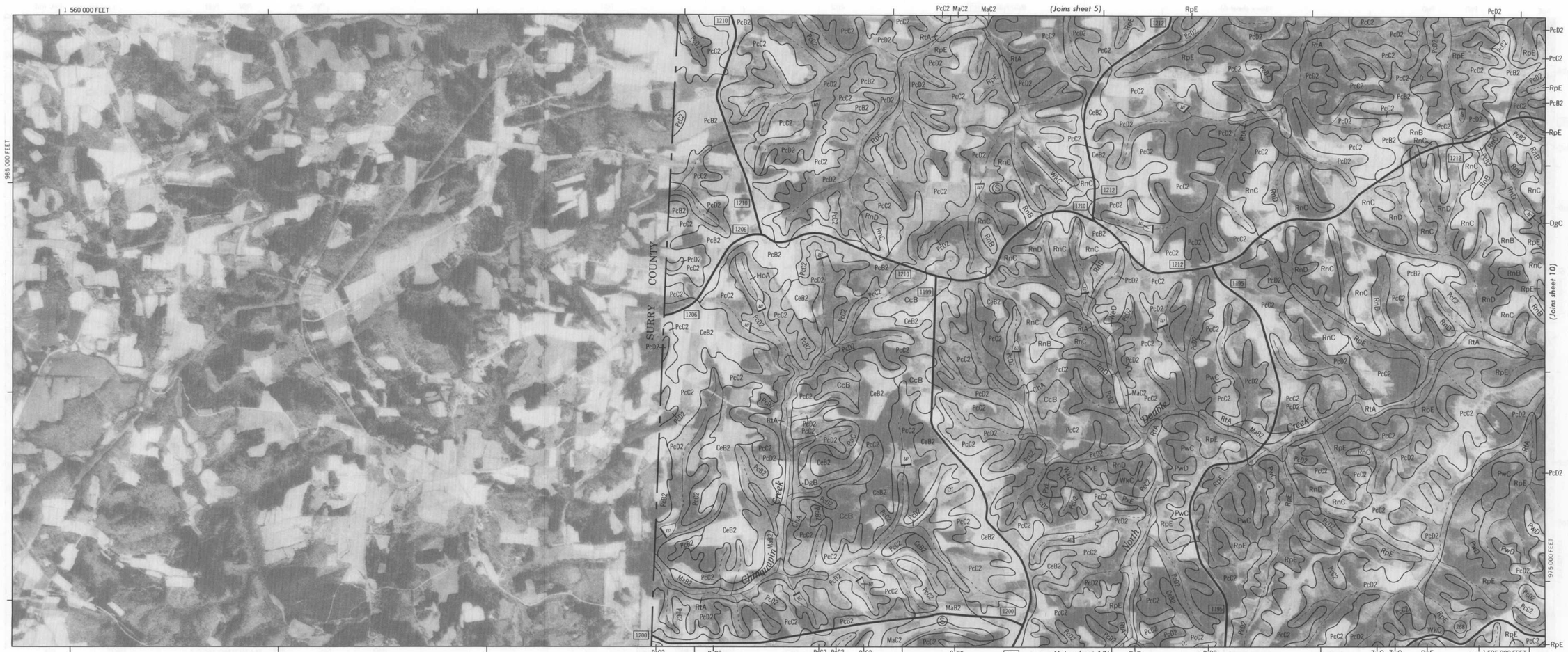

1 635 000 FEET
1 000 000 FEET
1 665 000 FEET
990 000 FEET
Lawsonville
Little Snow Creek
Buck Island Creek
Snow Creek
Mill Creek
Raccoon Creek
(Joins sheet 3)
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 11)
N
7
8
1497
1606
1652
1651
1657
1655
1674
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 8



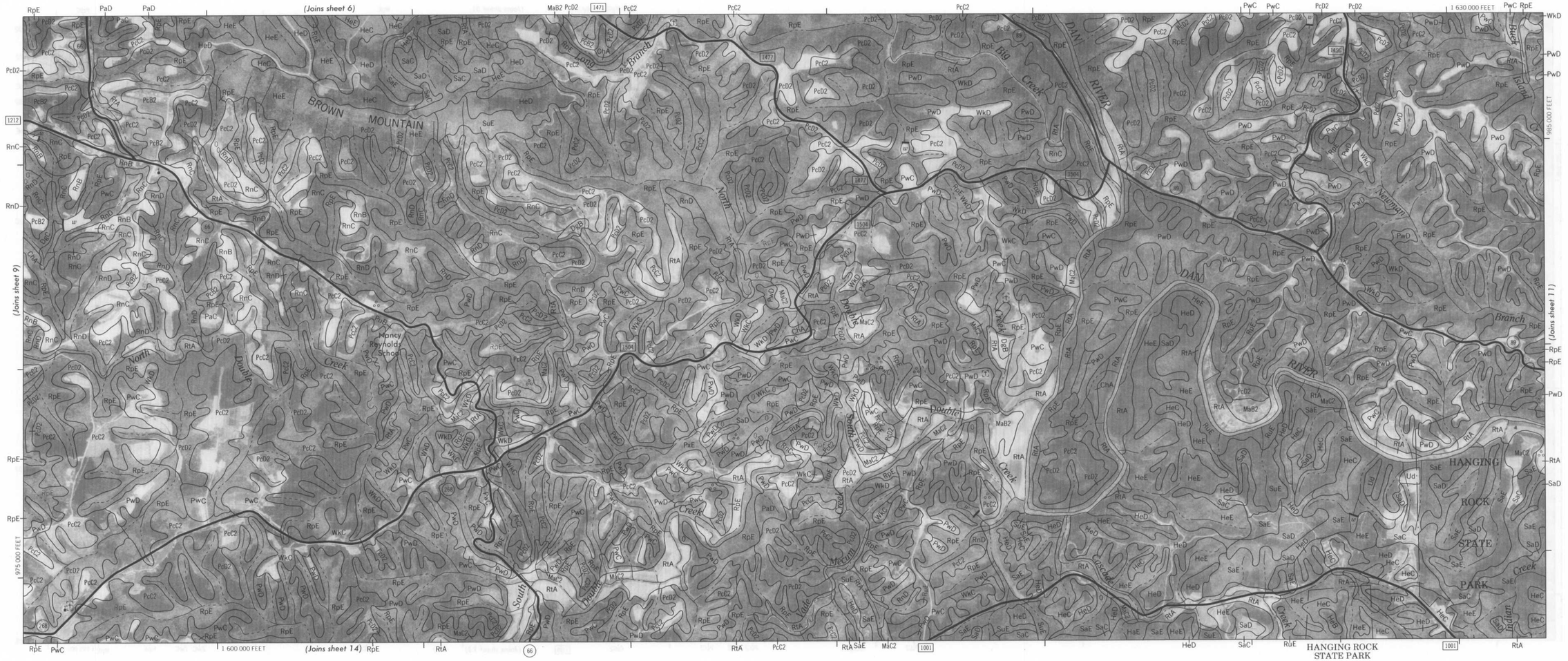
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

9

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 10

11

N

SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 12

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 14

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 15

N

STOKES COUNTY, NORTH CAROLINA NO. 16

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 18

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

20

N

1 3/4 1/2 1/4 0 1 2 MILES

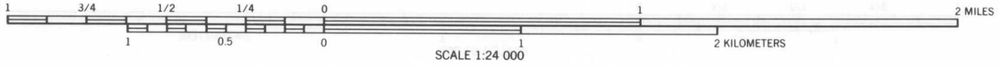
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 20

N


1 560 000 FEET
940 000 FEET
SURRY COUNTY
Pinnacle
(Joins sheet 17)
(Joins sheet 22)
(Joins sheet 25)
1 590 000 FEET
930 000 FEET
West Prong Little Yadkin River
East Prong Little Yadkin River
Yadkin River
Little Yadkin River
Danbury
SOUTHERN


1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

22

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 24


1 560 000 FEET
925 000 FEET
915 000 FEET
1 590 000 FEET
(Joins sheet 21)
(Joins sheet 26)
SURRY COUNTY
FORSYTH COUNTY
Yadkin River
Little Crooked Run
Crooked Creek
Crooked Run
water
25
N
SCALE 1:24 000
2 MILES
2 KILOMETERS

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 26

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

STOKES COUNTY, NORTH CAROLINA NO. 28